TEST 1

Steam across the water

A look at the early history of boats powered by steam

During the 1600s, very early in the development of steam engines, inventive spirits like the Frenchman Denis Papin dreamed of – and experimented with – boats driven by steam, rather than by the wind or human effort, but many decades passed before those visions became reality.

Englishman Jonathan Hulls took out patents on a steamboat in 1736, but it was to be driven by a Newcomen engine, which was heavy and therefore inefficient, and would never be a success. In 1763, William Henry, an American. put a Watt steam engine in a boat, but it sank. Nearly 20 years later, in the 1780s, a steam-powered paddle-wheeler managed to last fifteen minutes against the current on the River Saone in France, but lacked the endurance for longer trips. Developments elsewhere included a boat driven by a steam-powered water-jet and able to do six kilometres per hour. However, all these steamboats were either too slow or too expensive to run. For example, American John Fitch successfully trialled his first steamboat in 1787, but although he tried a number of designs and solved many technical challenges – one of his boats could even travel at 13 km/h – he could never convince sceptics that steamboats would pay.

The 19th century came before real success could be claimed. In Scotland in 1802, Lord Dundas launched the steamboat Charlotte Dundas, which was driven by a paddle wheel and had an improved engine designed by William Symington. Barges, some weighing as much as 70 tonnes. were towed by this steamboat 30 kilometres along the Forth and Clyde Canal to Glasgow, Scotland’s second city. Soon after, success came to American Robert Fulton, whose countrymen called him ‘the father of the steamboat’. Inspired by news of the Charlotte Dundas, Fulton ran steamboat trials on the River Seine, in an attempt to attract French support for his submarine Nautilus. He later imported a Boulton-Watt steam engine and built a boat to use it in. In 1807, the Clermont began a scheduled passenger steamboat service between New York and Albany, 250 kilometres up the Hudson River, taking 30 hours for the trip. Within few years, steamers were running on the St Lawrence River in Canada and would soon appear on other rivers and lakes, including the Mississippi River, a most famous venue for the paddle-wheelers.

Back in Scotland, Fulton’s ideas inspired Henry Bell, who launched his Comet in 1812 on the Clyde between Glasgow and Greenock. Inside a decade, dozens of steamboats were to be seen on the rivers, lochs and canals of Scotland, carrying cargo and occasionally passengers. The age of steamboats had come.

Once steamboats were carrying passengers and industrial goods along the inland waterways and sheltered coastlines of Europe, North America and elsewhere, the challenge became to send steamboats onto the open ocean, such as across the Atlantic Ocean, between Europe and the US. Travelling under steam power alone would require engines to use less coal so the ship could stay at sea for several weeks. In order to provide a reliable service, it was also necessary to replace paddle wheels as a source of power with something less affected by the rolling of the ship.

Without waiting for such breakthroughs, crossings under a combination of steam and sail got underway in 1819 with the American ship Savannah. A regular service took another two decades and introduced the famous name of Cunard. Securing the British government contract for the mail service across the Atlantic, Samuel Cunard established a shipping line in 1840, soon carrying passengers as well, and offering guaranteed sailing dates. Cunard's first ships used a sail-steam combination, but the era of the passenger liner, using steam alone, was getting close.

When it came to building the ships, the versatile British engineer Isambard Kingdom Brunel set the pace. Brunel, brilliant and daring, had already built the Great Western Railway. He created ever bigger ships – faster, more luxurious and comfortable for passengers. The Great Western, launched in 1838, was 70 metres long and crossed from Bristol to New York in just fifteen days. The largest paddle steamer ever built was Brunel's Great Eastern. Ultimately too expensive to run as a passenger ship, it was leased to lay the first submarine telegraph cable from Europe to America. His 1853 Great Britain, nearly 100 metres long and luxuriously appointed, was the first ocean-going steamship made of iron, and the first to use the underwater screw propeller for powering movement in place of paddle wheels. The idea of the screw had been around since the experiments of the American John Stevens in 1803, but only in 1838 did a large steamer use one, the riverboat Archimedes built by Francis Pettit Smith. Later ships had twin screws for reliability.

In many modem ships, steam turbines have replaced engines with pistons, with fuel oil instead of coal to fire the boilers. Diesel engines keep others moving. The largest ships afloat now would dwarf Brunel's Great Eastern (launched in 1860); the Atlantic can be crossed in only four days. But in whatever form, the ever-evolving descendants of the original visions of Denis Papin and Robert Fulton continue to travel the seas in vast numbers.

Questions 1–6

Complete the table below.

Write **ONE WORD ONLY** from the passage for each answer.

Date	Event
1600s	● Early inventors like Papin started to develop boats that relied on steam instead of manpower or wind.
1730s	● The engine of Jonathan Hulls' steamboat was (1)__________________ due to its weight.
1780s	● A French paddle steamer did not have the (2)__________________ to keep going for more than a quarter of an hour. ● John Fitch overcame a number of (3)__________________ problems

	with his steamboat designs.
Early 1800s	• The Charlotte Dundas pulled barges to Glasgow. • In France, Fulton used a steamboat to try to raise interest in a (4)___________________ • Passengers in the US began to be carried regularly by a steamboat called the (5)___________________
1812 onwards	• In Scotland, steamboats transported some passengers, but mostly (6)___________________

Questions 7–13

Choose **TRUE** if the statement agrees with the information given in the text,

choose **FALSE** if the statement contradicts the information,

or choose **NOT GIVEN** if there is no information on this.

7 For steamboats to cross the Atlantic Ocean, engines which used fuel economically were needed.

8 Using paddle wheels guaranteed reliability on ocean crossings.

9 The Savannah was much faster than a regular paddle steamer.

10 Brunel preferred designing railways to steamships.

11 The Great Britain had more than one innovative feature.

12 The design of the riverboat Archimedes was widely admired.

13 Modern ships that cross the Atlantic use the same energy source as the early steamships.

IQ Scores

How they are changing and what the changes

A Studies from numerous countries suggest that IQ scores have been rising fast since at least the 1950s - enough to mean that someone with an IQ classed as average at that time could be labelled as having low Intelligence today. However, psychologists disagree about what the upward trend in scores really means. Some researchers argue that people are not getting more intelligent overall, but just getting better at a particular sort of problem solving. Others say they have found echoes of rising 1Q scores in 'real world' measures of intelligence. To confuse things still more, there are hints that the trend may be about to grind to a halt.

B James Flynn, a professor of political science, first showed that IQ scores were rising in the mid-1980s, and became famous after others dubbed the pattern he had observed the 'Flynn effect. In a landmark paper he made detailed comparisons across fourteen countries of trends in the results of tests that measure reasoning power.

Overall, these showed a real growth in scores of up to 25 points in a generation. To find out more, Flynn went on to look at scores for each type of reasoning that IQ tests set out to measure, such as verbal, numerical and visuo-10 tests set ou spatial. This last test category usually includes 'Raven's matrices' - sequential patterns with one piece missing. The candidate has to choose, from a set of alternatives, which shape to put in the empty space. When Flynn took a closer look ace. Whe at the scores, the pattern was clear. The strongest gains in almost every case were on Raven's matrices and similar tests, while verbal and arithmetical scores showed more modest rises. Since presenting his original paper, Flynn has looked at data from further countries and found the same upward trend, with the same skills responsible for most of the increase.

C Flynn feels that his eponymous effect is meaningful, but does not interpret it as evidence that people are becoming cleverer. Our grandparents were not retarded and we are not geniuses, he says. More likely we have simply developed the skills and habits of mind that make us better at solving abstract problems, and - just as importantly - we take such problems seriously. Flynn belleves that demands of visuo-spatial abilities have grown because of TV, computers and cars, and also that. In societies where intelligence has become something people focus on excessively abstract problem-solving skills develop faster than other skills.

D Others have different views about what might account for the increase in 1Q scores. John Rust of the University of London suggests that it is not just an increase in visuo-spatial activities that is pushing up IQ scores. He believes that there are several factors, including the fact that, in more complex societies, people have to think harder to find solutions to problems they face. He also points out that if just one mind grasps a new concept, such as Einstein and the theory of relativity, it may then be easier for society in general to think in a more complex way. Others, such as experimental psychologist Robert Howard, argue that overall Intelligence really has risen, helped by better nutrition, smaller familles, wider access to education and other environmental changes.

E Howard's latest research has sent him on a different line of enquiry. Controversially, he now believes that the rise in IQ scores might have peaked in industrialised countries. To support this view, he cites data from Denmark. The Danish military still summons virtually all young men before a draft board to identify who is suitable to do military service. Since 1957, all 17-year-olds there have taken exactly the same qualifying IQ tests - including ones similar to Raven's matrices. Candidates must also be able to answer verbal questions such as 'Sun is to day as Moon is to ?', and number-series questions such as '2, 3, 5, 8, ?'. Results in these tests have been carefully analysed by Thomas Teasdale, a neuropsychologist. He found that during the 1960s and '70s, scores showed gains on a scale similar to those of other countries, but by the 1990s the rate of Improvement had slowed right down to about one IQ point over the decade. Furthermore, the scores were improving only on the visuo-spatial questions; verbal and numerical performance was flattening out. Most intriguingly, however, scores from 1999 onwards show an overall downturn. One explanation might be that there is some absolute ceiling to people's abilities to perform these tasks, no matter how much the prevailing culture encourages them.

However, as Teasdale points out, if such a ceiling had been reached, the test results should show scores pushing against it rather than actually falling.

F Flynn is keeping a close eye on the findings, but is not jumping to conclusions until data from other countries is available. However, he does wonder whether the conditions leading to dramatic Improvements in mental ability disappear as societies become more prosperous. He points out that in human history, prosperity often led to decadence, and argues that the case of ancient Rome can be viewed as an Illustration of this.

Questions 14–18

Look at the following statements (Questions 14-18) and the List of people. Match each statement with the correct person, **A**, **B**, **C** or **D**

Choose the correct letter, **A**, **B**, **C** or **D**, in boxes 14-18.

NB *You may use any letter more than once.*

List of people

A. James Flynn

B. John Rust

C. Robert Howard

D. Thomas Teasdale

	A	B	C	D
14 Modern technology has influenced some aspects of human intelligence.				
15 IQ scores may not have attained their natural limit.				
16 Improved diet has a positive effect on mental powers				
17 Exceptional individuals can have an impact on collective intelligence.				
18 As societies become more sophisticated the need for problem-solving skills increases.				

Questions 19–22

Reading Passage 2 has six paragraphs, A-F

Which paragraph contains the following information?

Choose the correct letter, **A-F,** in boxes 19-22.

	A	B	C	D	E	F

19 an account of a selection procedure involving a particular group of people						
20 a description of one component of a visuo-spatial test						
21 an overview of the different interpretations of IQ score trends						
22 an example of the negative effect affluence may have on IQ trends						

Questions 23–26

Complete the summary below.

Write **NO MORE THAN TWO WORDS AND/OR A NUMBER** from the passage for each answer.

James Flynn

During the (23)____________________________, James Flynn conducted research showing that IQ scores were increasing. Flynn then analysed specific kinds of reasoning ability separately. He found that tests called (24)_____________________________, which measured visuo-spatial skills, accounted for the biggest score increases, whereas scores in numerical and (25)________________________components rose less steeply. Results from research in other (26)________________________**,** which Flynn has examined more recently, are consistent with his earlier findings.

Practical Learning in the Classroom

A teacher describes a case study involving middle school students and traditional earthen architecture

A The way we think about architecture in schools has come along way. Once, studying architecture in the art class meant learning to appreciate great buildings art-history style, through slide presentations. In recent years, though, the American Institute of Architects has fostered the idea that the process of architectural design, not just the appreciation of architecture, is a beneficial aspect of the art curriculum (Sadler, 1989).

B The value of architectural design is that it is the concrete training ground for a broadly applicable creative process. Architectural training can help people design structures to meet needs. It can help farmers design crop rotations to meet needs. Furthermore, it provides hands-on experiences that reinforce learning in various other subjects, from math to social studies.

C In the ongoing dialogue about architecture in the middle school art curriculum, many believe students should actually build the structures they design in their courses. Although the technology and expertise required of modern architecture can prohibit students from actually realizing their designs, traditional architectural materials and methods remain quite accessible to the art classroom. Traditional architectural materials, such as earth, clay and straw, are cheap, easy to work with and readily available. Further, when students participate in the construction or preservation of a traditional earthen structure in their local community, they engage in a form of experiential learning and they are motivated to invest in the project. This is evident in a case study of an **adobe*** conservation project with middle school students in the town of Zuni, New Mexico, in the Southwestern United States.

D Traditional architecture reaches back to preindustrial America, when local resources and cultures produced structures in styles unique to each region. In New Mexico, examples of hand-built earthen structures still abound. The region has seen some decline in traditional architecture as industrialization has brought new building codes and materials; however, the traditional, non-industrial home, either preserved from earlier generations or newly built, remains in use. Traditional building materials and the land that supplies them are so accessible that handcrafting a house still remains feasible.

E Thus, with no technical expertise and little cost, middle school students can participate in the construction or preservation of a traditional earthen structure. During the project, a student will get to know the materials, understand the chemistry, solve problems, work with classmates, and exercise muscles. The student can apply knowledge of design principles and the creative process while participating in a cooperative effort. But most significantly, this type of project-based activity motivates students to invest intellectually and emotionally in the outcome.

F The town of Zuni, where I taught art, was surrounded by adobe construction, new and old. Behind our main high school building there was a one-room adobe structure which was once used for teaching. Now it served as a place where old furniture could be kept. I sent my class home with the oral history assignment to ask their family, friends and neighbors questions to find out about that building. From their research we compiled a sketchy history: it began as a kindergarten classroom; it later became an art classroom; now it was full of broken desks.

G The building's design kept it relatively warm in the winter, even without heating, due to its broad south face, and it stayed cool in the summer due to its spacious, ventilated attic and massive earthen walls. Because of this, my students agreed it was worth preserving and were enthusiastic about helping. Preservationist Shalie Gasper arrived in the fall to help with an assessment of the building's needs. She recommended replacing the **stucco**** that encased the original adobe walls with a traditional mud plaster. She showed us where to find local supplies of sand and clay soil for the plaster mix. We began work on the stucco removal in late fall. The next spring the students were ready to replaster. To teach the traditional skills, Gasper and other local specialists joined us. They gave my class three full mornings of intensive workshops on history and preservation as well as mud-plastering technique, and the building got a new coat of traditional mud plaster.

H Small design-and-build projects such as this can be seen through to the finish when working with earth in the art curriculum. A simple landscape feature such as a wall, entryway, or arch can draw students into important aspects of design that involve the structure's interaction with people, the surrounding landscape, and natural elements. The same project may provide an opportunity to focus on the chemistry of soil or the structural dynamics of construction. Design goals might guide students to involve traditional forms, consider formal aspects, or integrate math skills of measuring and estimating.

I During our traditional architecture unit, the students realized that something old and almost forgotten is valuable and worth preserving. Many others in the community and around the country share this renewal of interest in traditional earthen technologies. It is the connection to a cultural heritage that interests some; the quality of living within massive, natural walls that attracts others; or for others, the sustainability of the process and the minimal energy spent in construction. The value of adobe in general is becoming more and more known, but little has been said about its value in the art curriculum until now. This experiment in adobe conservation with middle school students convinced me that traditional architecture deserves a place in the regular curriculum.

***adobe:** a mixture of mud and straw that is made into bricks and used for building

****stucco:** fine plaster used for coating wall surfaces

Questions 27–31

Choose the correct answer.

27 What education initiative does the American Institute of Architects currently promote?

- multimedia presentation of information in classrooms
- the study of monumental buildings throughout history
- the practice of designing architectural structures
- processes to add more art classes in schools

28 In the third paragraph, what problem with teaching architecture on art courses does the writer note?

- Technology-based courses are unavailable.
- Students cannot always construct their designs.
- The curriculum is too traditional.
- Students lack motivation.

29 What is the greatest benefit for students that the writer sees in a traditional architecture project?

- personal connection to the end result
- participation in a cooperative project
- building of problem-solving skills
- conservation of a traditional building

30 What is the purpose of the eighth paragraph?

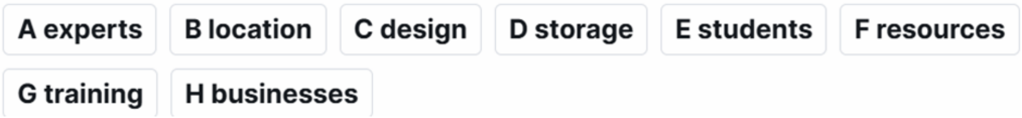
- to explain why it is important that projects be small
- to outline the multiple skills involved in one project
- to discuss strategies for connecting content areas
- to propose suggestions for traditional earth projects

31 What does the writer say about traditional building and the general population?

- Earthen architecture is becoming a profitable business.
- Earthen architecture is less feasible in some areas of the country.
- Interest in earthen architecture varies from region to region.
- People are attracted to earthen architecture for different reasons.

Questions 32–36

Complete the summary using the list of words, **A-H**, below.



A experts **B location** **C design** **D storage** **E students** **F resources**
G training **H businesses**

The Zuni earthen architecture project

The students in Zuni chose to renovate an old building which was being used for (32)______. They came to an agreement that the building was worthy of rehabilitation based on its functional (33)________. At the beginning of the project, students were given the task to discover the history of the building through interviews with local residents. Through the course of the project, they learned where to locate (34)________ for the project. They also worked closely with a number of (35)________ on each step of the project. During the project, students were also given (36)________ to build useful skills.

Questions 37–40

Choose **YES** if the statement agrees with the claims of the writer,

choose **NO** if the statement contradicts the claims of the writer,

or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

37 The price of materials is one drawback to using traditional architecture.

38 Earthen structures can easily be built in all regions of the U.S.

39 Working with a traditional earthen structure can have physical benefits.

40 A traditional architecture curriculum is best suited to middle school level students.

TEST 2

Australia's cane toad problem

Australia to control pests has itself become a pest

A In the north of Australia there are many sugar cane plantations, which early in the 20th century were being damaged by a particular pest. This was a species of beetle whose larvae, the infant form of the beetle, live underground in the soil in the sugar cane fields. The sugar cane plants were weakened or died because their roots were eaten by the larvae. This had serious economic consequences for sugar cane farmers. Modern pesticides were not developed until the 1940s, so farmers had to use what was available at the time. Chemicals like arsenic and copper were used, but these were not only expensive but also stayed in the environment and were poisonous to people, plants and animals. It was generally acknowledged by government, farmers and scientists that cheaper and safer methods of pest control had to be found.

B A promising replacement for copper and arsenic was the use of biological control. Farmers already used some forms of biological pest control in the form of predatory and parasitic wasps and flies, insect-eating birds, and plants from different regions or countries to control pests. Common practice was to release these introduced agents into new environments, the expectation being that they would destroy resident pests. Some species of toad already had successful records as agents of biological control in gardens. For example, in 19th-century France toads were sold to gardeners at markets in Paris to eat insect pests in their gardens. In the early 20th century French sugar cane farmers first took giant toads from South America to control pests in their Caribbean sugar cane plantations. Although there is no evidence that these toads did help to control pests, sugar cane scientists then carried some of these toads from Jamaica and Barbados to Puerto Rico and from there to Hawaii.

C The idea of biological control of pests was not new to Australia. For example, in 1926 there had been a highly successful prevention of the increase of the exotic prickly-pear cactus by the introduction of a moth from Argentina. This success added strength to the argument that biological control was the answer to the sugar cane industry's pest problems. Accordingly, in the early 1930s a decision was taken to introduce the giant South American toads, which in Australia are now commonly called cane toads, into Australian sugar cane plantations.

D In 1935, an Australian entomologist brought 101 cane toads from Hawaii and released them in sugar cane plantations in the north of Australia. However, over the following years it became clear that the cane toads were a failure. There was a fatal flaw in the plan to use them as a form of biological control. This was that earthbound cane toads were expected to eat the mostly flying adult beetles in order to eliminate the soil-dwelling beetle larvae that ate the roots of the cane sugar plants. This, of course, cane toads could not do.

E Prior to their introduction in Australia, there had been very few opponents and only one made his views public. He was a retired former Chief Entomologist from the state government of New South Wales named Walter Froggatt. He forecast that cane toads might become as great a pest in Australia as rabbits. However, Froggatt's peers rebuked him and eminent scientists branded his views 'decidedly pessimistic'. It is estimated that today as many as a hundred million cane toads form a toxic infestation which is slowly spreading throughout the land.

F Cane toads are large, heavily built amphibians. Average-sized adults are 10-15 cm long and weigh more than a kilo. They have large swellings on each shoulder from which they squirt poison when they are threatened. This venom contains 14 different chemicals, but they do not appear to be harmful to humans as no-one has died in Australia from cane toad poison. Until recently there was no understanding of the toxicity of cane toad poison, but it is now dear that freshwater crocodiles, goannas (large lizards) and dingoes (wild dogs) have died after eating cane toads. Cane toads compete with native Australian fauna for food, and eat the eggs and young of ground-nesting birds. As their numbers increase, they are taking over more and more of the land where native Australian fauna live.

G The lesson that can be learned from the introduction of cane toads is important. It is wrong to think that such an awful biological event could not be repeated. In this instance, the catalyst was the overwhelming consensus of support for introducing cane toads to Australia. The error was that there was little or no testing of these biological agents before they were introduced to see what unplanned effects they might have on the environment.

Questions 1–7

Complete the table below.

Write **ONE WORD ONLY** from the passage for each answer.

Pest control

Early 20th-century problems in Australia

The larvae of a type of (1)__________________ were a serious pest in sugar cane fields.

Its larvae ate the (2)__________________ of the plant.

Chemical pesticides were unsatisfactory because they were:

- poisonous
- (3)_______________
- difficult to remove from the ground

Experiences with biological pest control

The use of insects, plants and birds was widespread.

In the 19th century French (4)__________________ used toads.

In Australia a (5)_________________ stopped the spread of prickly-pear cactus.

Cane toads were brought to Australia from (6)__________________

Cane toads proved to be a (7)__________________ as pest control.

Questions 8–13

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

8 The outcome of the introduction of cane toads was immediately obvious.

9 Rabbits were introduced to Australia to control weeds.

10 Walter Froggatt was criticised for his efforts to stop the introduction of the cane toad to Australia.

11 The average size of cane toads has increased since their introduction.

12 Australian animals can eat cane toads safely.

13 In many places cane toads are gaining control of the habitats of Australian fauna.

Farmers

An iconic chain store in New Zealand reaches a milestone

A The chain of stores known as Farmers began one hundred years ago as a mail order company. Today the Farmers chain employs 3,500 staff across 58 branches making it the most venerable institution of its type in New Zealand. Coming to Farmers once a week has become woven into the fabric of New Zealand culture, 'says business historian Ian Hunter. By 1960, one in every ten people had an account with the company. It was not only a shop but also hosted the largest annual parade in the country, the Santa parade each Christmas time. Gary Blumenthal, whose family have been customers for three generations, understands well the role Farmers have played in New Zealand culture.' We were on holiday in Auckland,' he explains, 'and I decided that the lookout tower on top of the Farmers building would be a unique place to fit the ring on my new fiancee's finger.' The couple has been married for 50 years.

B Farmers' longevity can be attributed to the philosophy fostered by Robert Laidlaw, the Scottish immigrant who established the business. Right from the outset, Laidlaw guaranteed customer satisfaction, and those who were not entirely happy with a purchase would receive a full refund with no questions asked. This was certainly the first time such a guarantee had been made by a New Zealand retailer and was probably one of the first worldwide. Laidlaw believed that the scheme could work if he ensured that every product sold was of the highest quality relative to its price.

C Another important aspect of the Farmers' philosophy was to internationalize the New Zealand market. By the time the Hobson Street store opened in 1920 in order to sell directly to customers for the first time, Laidlaw had established buying offices in New York and London so as to offer his customers the latest designs. This was a bold move in those days and won Farmers a devoted following. It's also true that whoever you speak to regarding Farmers in the early years, whether managers or workers, they all emphasize how the company represented a large family. Everyone employed by Laidlaw felt they were building something that would ultimately be to the benefit of the whole country. For example, to mark the centenary celebrations, 58 Farmers' stores around the country announced the neighborhood charities they would raise funds for everything from guide dog services to volunteer fire brigades will benefit.

D Farmers has always had a heart, according to former board chairman Rawdon Busfield. 'One day I was in the Hobson Street store and a woman came in with two small children-they didn't have a lot of money, you could tell. That week we had a special on, a big bar of chocolate for a shilling... But the boy only had a penny. I took the penny and gave him the chocolate.' However, not everything has stayed the same. Farmers was once home to genteel tea rooms, children's playgrounds, and an annual sale to celebrate the birthday of Hector the Parrot-who came to embody the store in the eyes of many shoppers and who died, aged 131, in the 1970s. You could buy houses from Farmers, and its saddle factory supplied the armed forces. In fact, although the company has grown considerably over the years, today it sells a narrower assortment of products than in the past.

E Walk through a Farmers store today and you'll see big changes. Its most recent branch in the suburb of Albany is filled with bright lights and big brands. The branch sells cosmetics from 16 different international companies and buys from approximately 500 suppliers, of which about 30 percent are locally owned. 'Eight or ten years ago,' says current chief executive Rod McDermott, 'lots of brands wouldn't partner with us. We weren't in trouble as such, but we could have been doing much better because we were focused too much on price and not on fashion. The reorientation of the last decade has seen a great improvement.'

F Farmers almost didn't pull through one economic crisis. In the mid-1980s, business was booming and the company had stores throughout the country. Then, with sales topping $375 million, it was taken over by Chase Corporation. Lincoln Laidlaw, the son of the company's founder, remembers the dark days following the stock market crash of 1987 and the collapse of the Chase Corporation. The business was being divided up, 'he says,' and I believe that the original culture of the store was dispelled and it hasn't been recovered. That's a shame, but the business is still strong. 'For a few turbulent years the stores were controlled first by a consortium of Australian banks, and later a local corporation. In 2003, it went back into 'family' ownership with the purchase by the James Pascoe Group owned by an established New Zealand retail family. Brand power has made Farmers profitable again, according to McDermott.' And now we're becoming the brand we used to be... It's like the rebirth of an icon.

Questions 14–18

Reading Passage 2 has six paragraphs, A-F.

Which paragraph contains the following information?

Choose the correct letter, **A-F**, in boxes 14-18.

	A	B	C	D	E	F
14 a mention of the company being sold						
15 a reference to how the range of goods for sale has become more limited						
16 an example of an innovative offer made by the company's founder						
17 a description of a romantic event on the shop's roof						
18 a description of the latest store in the chain						

Questions 19–22

Complete the sentences below.

Write **NO MORE THAN TWO WORDS** from the passage for each answer.

Farmers was set up as a/an (19) ______________________ business before it became a chain.

Robert Laidlaw setup (20) ______________________ overseas so he could sell up-to-date fashions.

According to employees, Farmers was like a/an (21) ______________________.

Farmers held a/an (22) ______________________ once a year in honour of the company's famous pet.

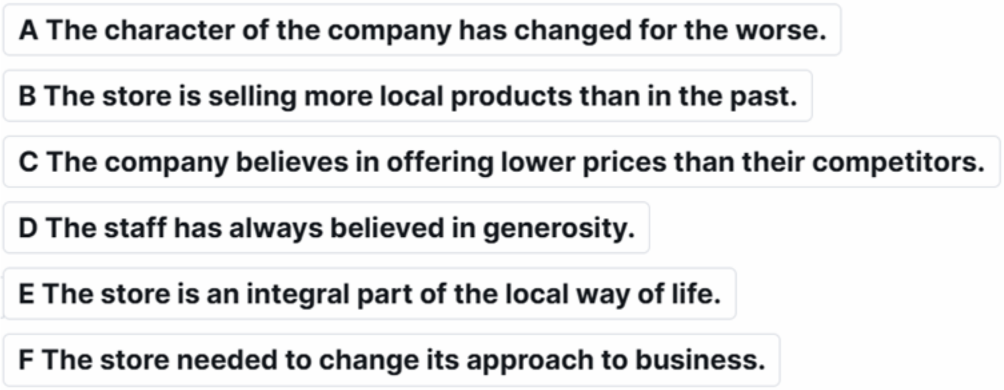
Questions 23–26

Look at the following people (Questions 23-26) and the list of ideas below.

Match each person with the correct idea, **A-F.**

Choose the correct letter, **A-F**, in boxes 23-26.

List of Ideas



A The character of the company has changed for the worse.

B The store is selling more local products than in the past.

C The company believes in offering lower prices than their competitors.

D The staff has always believed in generosity.

E The store is an integral part of the local way of life.

F The store needed to change its approach to business.

List of people

Ian Hunter (23) ______________________

Rawdon Busfield (24) ______________________

Rod McDermott (25) ______________________

Lincoin Laidlaw (26) ______________________

LIFE ON MARS?

A When scientists began observing Mars with their first primitive telescopes, they assumed from the start that the planet was peopled. The 18th-century astronomer William Herschel, noting the seasons and atmosphere of Mars, declared that 'its inhabitants enjoy a situation similar to our own'. A century later, astronomers asserted that they could detect canals running across the Martian landscape. These canals, argued US scientist Percival Lowell, had been built by technologically advanced Martians to transport water from the poles to the equator of their drying world. 'Martian folk are possessed of inventions of which we have not dreamed,' he argued.

B The vision of an advanced culture trapped on a drying world was taken up by the British writer H.G. Wells in 1898 in his masterpiece The War of the Worlds, in which Earth is subjected to a pitiless invasion from a race of hideous Martians armed with poison gas and heat rays. Martians became synonymous with grotesque, threatening aliens, at least as far as the public was concerned. Scientists were more restrained, but still supported the idea that the planet might support relatively complex life forms.

C Then, in the late 1960s, rocket science changed our image of Mars forever. The US Mariner probes swept past Mars and sent back pictures, not of a world covered in vegetation, as many scientists still expected, but of vistas of cratered, arid deserts. Finally, in 1975, two huge US probes settled on the Martian surface and began a series of experiments aimed at pinpointing, once and for all, the existence of air-breathing organisms. None were found, for the Viking probes landed in areas as dead as the Sahara Desert. All that was sent back were images of a bleak, boulder-strewn terrain. Mars was declared officially dead – for a while.

D Since that time, two critical pieces of evidence have been found on Earth which support the idea that Mars has life. The first is known as ALH84001, a meteorite that was blasted into space when a large body struck Mars 15 million years ago and which spiralled across the solar system to crash into the Antarctic. Analysis carried out by NASA scientist Imre Friedmann showed that the meteorite contained elements identical to those found on Mars by the Viking probes, and revealed chains of crystals similar to those created by earthbound bacteria. Friedmann believes that these could only have been created by living organisms. Others, however, argue that the crystals could have been laid down by simple chemical processes. A second area of support for the idea that living organisms could survive Mars's harshness has been provided by the study of extremophiles, bacteria that have been found in increasingly hostile landscapes on Earth – acid lakes, for example, and volcanoes.

E In the past few years, astronomers have become convinced that the Martian surface, although hostile and arid today, was once lush and welcoming. Images sent back by recent probes such as the Mars Global Surveyor have revealed dried-up riverbeds and old estuaries. Rivers poured into ancient seas, it appears, and rain swept the sodden terrain. Then catastrophe struck. Mars lost its magnetic field several billion years ago, explains British astronomer Paul Murdin. 'Earth retained one, and it protects our atmosphere. Without that protection, Mars's gases and water boiled off.' That is why they are so different today.

F The discovery of signs of water on Mars has changed everything. Some researchers believe that water from underground reservoirs still gushes through Martian valleys as occasional flash floods bubble to the surface. In the 1990s, the Mars Odyssey probe began to map the chemical make-up of the Mars soil, and discovered that much of the ground in the southern hemisphere of Mars is mixed with large quantities of ice. And where there is ice, there is likely to be liquid water, probably underneath. 'There are huge underground reservoirs on Mars, says Marcello Coradini, head of planetary exploration for the European Space Agency. I am now convinced of that.'

G Current projects are hoping to clarify the question of the presence of water once and for all. These are aimed at conducting experiments to detect the presence of a substance called carbon 13 in soil and rock samples on Mars; this would be, according to some researchers, an unequivocal indicator of the presence of living organisms, past or present.

H But would the presence of a few Martian organisms alter our world view in any significant way? Professor Juan Pérez Mercader of Madrid's Centre for Astrobiology in Spain believes that it would. 'For a start, we will be able to find out if Martian organisms have DNA, the golden molecule that controls the replication of earthly creatures.' If there is no DNA, that would show that Martian biology is quite unlike Earth's, and that on two planets, side by side in the same solar system, life evolved independently. If DNA is located, it would mean that life on Mars and on Earth may spring from the same source. 'If organisms can pop up that easily, our chances of finding intelligent versions elsewhere in the universe will look extremely good,' Pérez Mercader states. The discovery of any evidence of living organisms on Mars would also mean renewed purpose for manned space flight projects.

Questions 27–32

Reading Passage 3 has eight paragraphs, **A-H**.

Which paragraph contains the following information?

Choose the correct letter, **A-H**, in boxes 27-33.

	A	B	C	D	E	F	G	H
27 evidence that a rock found on Earth originated on Mars								
28 a plan to analyse material on Mars								
29 the reason Mars is no longer similar to Earth								
30 an observation suggesting that there is currently water on Mars								
31 a claim that construction had taken place on Mars								
32 a possibility that humans and Martians could share the same origins								

Questions 33–36

Choose the correct answer.

33 The 18th-century astronomer William Herschel believed that

- the Martians were physically similar to humans.
- the Martian environment resembled that of Earth.
- members of the Martian race were extremely primitive.
- the climatic conditions on Mars were very dry.

34 At the end of the 19h century, the public's ideas about Martians changed because of

- scientific discussion.
- media reports.
- a work of literature.
- a magazine illustration.

35 What does the writer say happened in the 1960s?

- The appearance of some regions of Mars changed.
- Evidence of organisms was found on Mars
- The Martian atmosphere was tested scientifically
- Earlier beliefs about Mars were disproven.

36 The study of extremophiles suggests that

- organisms can survive on Mars.
- organisms on Earth are like those found on Mars.
- Martian conditions resemble those in Earth's volcanoes.
- Martian crystals can survive acid conditions.

Questions 37–40

Choose **YES** if the statement agrees with the claims of the writer, choose **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

37 Lowell believed that Martian technology was more developed than human technology.

38 Information gained from Viking probes remains unchallenged.

39 There is evidence that there has been significant climate change on Mars.

40 Spanish scientists plan to launch space probes if DNA is found on Mars.

TEST 3

The History of the Chicken

The story begins 10,000 years ago in a jungle in Asia and ends today in kitchens all over the world

Chicken is the universal food of our era, crossing cultural boundaries with ease. With its mild taste and uniform texture, chicken presents a blank canvas for the national flavours of almost any cuisine. However, until the introduction of large-scale industrial production in the 20th century, the economic and nutritional contribution of chickens was small. Chickens were considered as domestic birds that were useful to humanity, but unlike other animals such as the horse or the ox, they did little to change the course of history. Nonetheless, the chicken has inspired contributions to culture, art, cuisine, science and religion over the millennia. Chickens were, and still are, a sacred animal in some cultures. The hen is a worldwide symbol of nurturing and fertility. The rooster is a universal sign of masculinity.

The domesticated chicken has a complicated family tree, stretching back 10,000 years. Recent DNA testing has shown that the chicken's wild ancestor is the red junglefowl. The bird's resemblance to modern chickens is seen in the red feathers on top of its head, the red flesh around its mouth, and its distinctive call in the morning. The females of this breed protect their eggs in the same way modern-day chickens do, and they make the same clucking sounds. In its habitat, which stretches from north-eastern India to the Philippines, the red junglefowl looks on the forest floor for insects, seeds and fruit, and flies up to nest in the trees at night. That's about as much flying as it can manage, a trail that made it relatively easy for humans to capture and domesticate it. But the red junglefowl is not the sole ancestor of the modern chicken. Scientists have identified three closely related species that might have bred with the red junglefowl. Precisely how much genetic material these other birds contributed to the DNA of domesticated chickens is unknown. However, recent research suggests that modern chickens inherited at least one trait, their yellow skin, from the grey junglefowl of southern India.

Once chickens were domesticated, cultural contacts, trade, migration and territorial conquest resulted in their introduction to different regions around the world over several thousand years. Chickens arrived in Egypt in around 1750 BC, as fighting birds and additions to zoos. Drawings of the birds decorated royal tombs, which contained the treasures that the kings and queens would take to the afterlife. Yet it would be another 100 years before the bird became popular among ordinary Egyptians.

It was in that era that Egyptians mastered the technique of artificial incubation, which freed hens to lay more eggs. This was not easy. Most chicken eggs will hatch in three weeks, but only if the temperature remains at around 38 degrees Celsius. The eggs must also be turned three to five times a day, and the humidity must remain stable at about 55 percent, otherwise physical deformities can result, or the eggs won't hatch The Egyptians constructed vast complexes of large rooms, which were essentially ovens, and these were connected to a series of corridors and vents that allowed attendants to regulate the heat from fires. The egg attendants kept their methods a secret from outsiders for centuries.

Around the Mediterranean, archaeologists have uncovered chicken bones from about 800 BC. Chickens were a delicacy among the Romans, whose culinary innovations included the omelette, and the practice of stuffing birds for cooking. European farmers began developing methods to fatten the birds, such as feeding them bread which had been soaked in wine. But the chicken's status in Europe appears to have diminished with the collapse of Rome. In the period after the fall of the Roman Empire, chicken farms vanished and the birds returned to the size they had been 1,000 years earlier.

Well into the 20th century chickens, although valued as a source of eggs, played a relatively minor role in diet and the economy. Long after cattle had entered the industrial age of centralized and mechanized large-scale production, chicken production was still a small-scale, local enterprise. The breakthrough that made today's huge bird farms was the inclusion of antibiotics, along with a mixture of different vitamins, in the food chickens ate. This allowed chickens to be raised indoors and be protected from cold temperatures and heavy rain as well as predators. This factory farming represents the chicken's final step in its transformation into a big protein-producing business.

Factory farms turning out an increasing amount of chicken have resulted in an increasing demand. Modern chickens are cogs in a system designed to convert grain into protein with staggering efficiency. It takes less than 1 kilogram of feed to produce 400 grams of chicken. By comparison, around 3 kilograms of feed are required to produce 400 grams of beef. A day-old chick can be turned into a 2 kilogram bird in six week – half the time it took two generations ago.

Chickens also make wonderful pets, as breeders will tell you. They are as colourful as tropical fish but more affectionate, as cute as guinea pigs and better catching mice than cats. In the USA, exotic and heritage breeds of chicken are being sold for a considerable source of money as the fashion for keeping chickens in the backyards becomes more popular.

All in all, the globe-spanning chicken is an epic story of evolutionary, agricultural and culinary success, outnumbering human beings on the planet by nearly three to one.

Questions 1–7

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

1 Chicken is globally popular because it can be used for different styles of cooking.

2 Chickens have poor capacity for flight compared to Junglefowl.

3 Scientists believe that the domestic chicken has more than one ancestor.

4 A modem chicken has the same skin colour as the grey junglefowl.

5 After the Roman Empire ended, chicken consumption in Europe declined.

6 Some people criticise the methods involved in factory farming chickens.

7 In the USA, fewer people are keeping expensive breeds of chicken at home.

Questions 8–13

Complete the notes below

Write **ONE WORD ONLY** from the passage for each answer.

The domestication and farming of chickens

Egypt

- In 1750 BC the first chickens were seen in Egyptian (8) ___________________ and used in fights.
- Pictures of chickens were used on the (9) ___________________ of kings and queens
- Egyptians developed a method of egg (10) ___________________ that didn't involve hens.
- For eggs to hatch, heat and (11) ___________________ levels had to stay the same.
- The eggs were hatched in rooms that functioned as (12) ___________________

Romans

- Farmers gave chickens a mixture of bread and wine to make them bigger.

20th-century farming

- Farmers started adding antibiotics and vitamins to chicken feed.
- Chickens were kept inside, safe from bad weather and (13) ___________________

A study of introvert and extrovert characters

(14) ___________________

We are often labelled as introverts or extroverts, and humans do seem to have biological propensities to behave in certain ways; some of us are naturally more talkative and sociable while others prefer more time alone. But, according to Canadian-born research psychologist Professor Brian Little, our traits are by no means fixed. In his book Me, Myself and Us: The Science of Personality and the Art of Well/-Being, Little suggests that we are often able to override our biological make-up through the adoption of what he calls "free-traits', which allow us to behave in a manner which contrasts with our natural selves. According to Little, we adopt these free-traits only when we need them, in order to meet the demands of different situations and reach targets and goals that are important to us - our 'persona projects' These projects might be big (such as career ambitions) or small (like cleaning the car) and pursuing them shapes our day-to-day behavior and our relationships with friends, family and workmates.

(15) ___________________

Little recommends that we might usefully think of ourselves as amateur scientists. We are continually exploring and testing the world around us to discover what works and what doesn't. We do things, say things, and then we observe the reactions and unconsciously store the results. We apply the knowledge gained from our 'experiments' to the advancement of our personal projects. Sometimes our personal project pursuit requires us to engage in free traits; at other times, we can just be ourselves. Little proposes that the successful pursuit of personal projects which are meaningful, manageable, supported by others and generate positive feelings can greatly impact our happiness and the quality of our lives.

(16) ___________________

Professor Little and one of his graduate students, Sanna Balsari-Palsule, have looked into the experiences of employees in a range of organisations. The reason for basing the research on this environment, as Balsari-Palsule explains, is that ‘in an ideal world, one's job would fit one's traits perfectly, but that's very rarely the case. As so much can hinge on how we behave with others while at work, I wanted to discover what happens when people push the limits of their ability to act out of character. Do employees experience detriments in their well-being or work performance and does this increase their chances of burnout?"

(17) ___________________

Their findings suggest that extroverts initially experience advantages over introverts at work, in terms of getting noticed and promoted more rapidly. However, when introvert employees higher up in the organisation act out of character and take on extrovert traits, they have equal performance ratings to those extroverts, and do not report any negative effects of this use of free traits. Balsari Palsule offers an explanation: introvert employees make frequent use of 'restorative resources ‘These are spaces designed to allow employees to read quietly or simply relax in order to recover their equilibrium after a strenuous session of acting out of character that would otherwise leave them feeling drained. However, if the same employees were expected to act out of character for more prolonged periods, without the chance to recover, the benefits could quickly turn into costs.

(18) ___________________

In the same study, however, extroverts report strikingly different, and much less rewarding, experiences of acting out of character. It appears that more outwardly confident personality types find it extremely hard-and stressful-to rein back their personalities and act as if they were introverted. We found this difference was most common among younger employees. It may be that introverts are generally so used to acting extrovertly in situations outside of the workplace that it becomes a relatively easy force of habit, particularly in Western cultures where extroversion is often highly valued. On the other hand, extrovert employees at the beginning of their careers are much less used to being isolated in an office for long periods of time, so may feel like caged animals, needing to feed off the energy of others in order to thrive, ‘says Balsari-Palsule.

(19) ___________________

In the second stage of research, Balsari-Palsule is looking into the idiosyncrasies of people's work projects and how the work environment plays a vital role in supporting or, in some cases, constraining them. For example, highly competitive environments, which place demands on employees to conform to certain types of behaviour, may leave little time for employees to pursue projects which are important to them on a personal level. This could eventually be detrimental to their well-being. She expects that a closer look at the influences of different factors in the work environment, in conjunction with how people behave, will shed more light on what acting out of character may lead to.

(20) ___________________

The implications of Little and BalsariPalsule's research are numerous and need to be taken into account by businesses. Balsari-Palsule suggests that it would serve companies well not to dismiss the costs of free-trait acting. She points out that compromised psychological and physical well-being can quickly result in more frequent occurrences of absenteeism. She also believes that management should rely less on handing out personality surveys that pigeonhole employees into introvert and extrovert categories. instead, organisations should adopt policies and build work environments that are supportive of free-trait expression, and also provide the spaces for people to be themselves. Furthermore, making these changes is also likely to lead to increases in productivity in the long run.

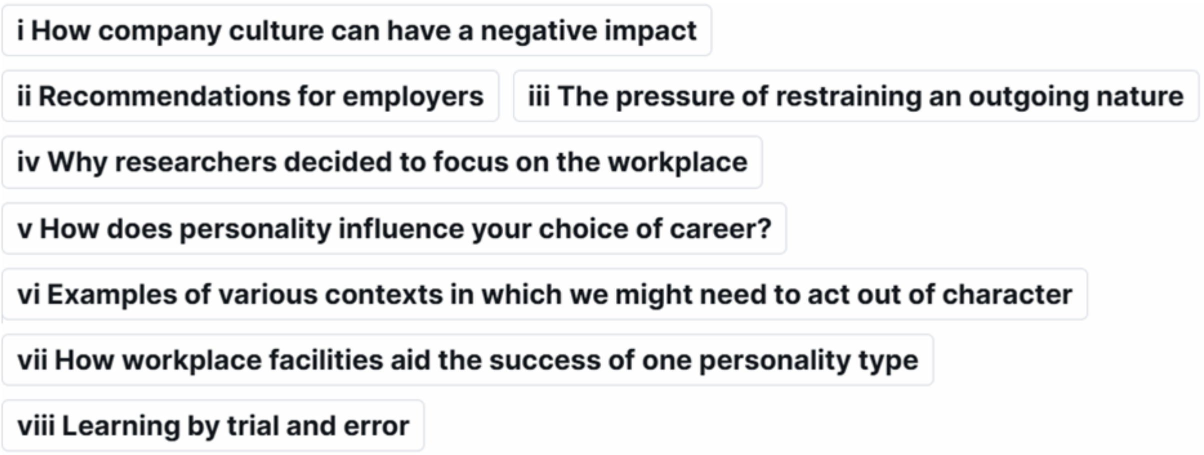
Questions 14–20

Reading Passage 2 has seven paragraph.

Choose the correct heading for each paragraph from the list of headings below.

Choose the correct number, **i-viii**, in boxes **14-20**.

List of heading



i How company culture can have a negative impact

ii Recommendations for employers

iii The pressure of restraining an outgoing nature

iv Why researchers decided to focus on the workplace

v How does personality influence your choice of career?

vi Examples of various contexts in which we might need to act out of character

vii How workplace facilities aid the success of one personality type

viii Learning by trial and error

Questions 21–22

Choose **TWO** correct answers.

Below are some statements about the possible characteristics of free traits.

21-22 Which TWO are made by Professor Brian Little in the 1st paragraph?

- They can affect the degree to which people are content with what they have.
- They are not used by people all the time.
- They influence people's choice of profession.
- They are useful in the pursuit of objectives assigned by others.
- They enable people to act in ways which are not typical for them.

Questions 23–26

Complete the sentences below.

Write **ONE WORD ONLY** from the passage for each answer.

In the second stage of her reseat, Balsari-Palsule will explore her theory that very (23)__________________________ workplaces prevent employees from completing projects of personal importance.

The research done by Little and Balsari-Palsule has many (24) _______________________ for businesses.

Balsari-Palsule thinks that managers depend too much on (25) _______________________ aimed at determining personality types.

Balsari-Palsule thinks that relieving the stress caused by free-trait acting could boost a company's (26) _______________________ over time.

Seeing the colour of sounds, hearing the colour of numbers

When the senses mix together

A What is the colour of five? What is the sound of blue? To most of us such questions are either meaningless or suitable only for poetry. But for some people these are questions to which very precise answers can be given. Five, for example, for some people is green, while others say the sound of a guitar is like someone blowing on their ankles. People who 'see' colour in numbers or letters of the alphabet and 'feel' sensation in sound have synesthesia – meaning literally 'joined sensation' – an extraordinary condition that causes certain senses to leak' into one another.

B People whose senses behave in this way are called 'synesthetes'. Some synesthetes take pleasure in it. To me it's like other people see the world in black and white, says one, who sees every letter, number, sound and pain in colour. Others learn to keep it a secret for fear of people laughing at them. But to neurologists investigating the brain it is of great interest. 'When scientists study normal perception,' says Daniel Smilek of the University of Waterloo in Ontario, Canada, there are lots of things we don't question because most of us perceive in the same way. Synesthesia, because it's abnormal, can give us new insights into normal perception.

C Seventeenth-century English philosopher John Locke was the first westerner to describe synesthesia. He wrote about a man who experienced bright red as the sound of the trumpet. Later, the condition excited the imagination of nineteenth-century European painters, such as the non-synesthete Wassily Kandinsky, who believed synesthetes were like good, much-played violins, which vibrate in all their parts and fibres. But it proved impossible to research and people lost interest. Recently, however, advances in brain imaging have sparked renewed interest.

D Early claims that the multi-sensory experiences of synesthesia were linked with the hallucinations of mental illness have long been disproved. Until 1993, many researchers dismissed it as another name for a vivid imagination, but then an experiment by Simon Baron-Cohen of Cambridge University in the UK showed that synesthetes who, when tested, had linked particular colours or shapes to letters, gave the same answers in 92 per cent of instances when tested again a week later. Non-synesthetes, given similar examples to imagine, returned the same answers in only 37 per cent of instances.

E Although there is some overlap between synesthetes as to what colour is linked to what – 56 per cent see the letter 'o' as white – most of the responses are individual. There are 30 possible sensory combinations, but links between sounds and colours are the most common. Women are between two and eight times more likely than men to have the condition.

F As yet there is no explanation for any of this, but small pieces of the jigsaw are emerging. A brain scanning experiment by Baron-Cohen in 1995 found that when synesthetes were listening to words, areas of the brain lit up that are normally only active in response to vision and colour. From this comes the notion that we may all have synesthesia at birth, when many parts of the brain are linked, but, as we develop, connections are pruned, so our senses become separated and the synesthetic mechanism is no longer intact. Somehow, synesthetes have kept their synaptic connections intact. It's an idea that has been challenged, however, on the grounds that if you give people certain drugs they will have synesthetic experiences, which suggests the mechanism is intact in adults but repressed.

G There are many more unanswered questions about synesthesia. For example, is the synesthete's colour response to a number five triggered by actually seeing the number five written on a page, or does the synesthete 'see' the colour just by thinking of the number five? The neurologist Vilyanur Ramachandran came up with a test for synesthesia which seemed to suggest it was the sight of the number that was important. He asked people to look at a page made up of specially drawn twos and fives that were a mirror image of each other. The fives were placed at random on the page but the twos were placed to form shapes such as circles or triangles. To most people the numbers just looked like a jumble without order, but to synesthetes the patterns made by the twos were very obvious as a different colour from the fives. 'This shows they were really sensing colour in the numbers they saw,' says Ramachandran 'Ideas don't form these kinds of patterns.'

H However, Smilek subsequently came up with evidence that what really matters is the idea of a number rather than the sight of it on a page. He asked a synesthete to do some simple mental arithmetic while looking at different coloured papers, The subject did not write her answers, but only thought of them and said them aloud. Smilek found that when the colour of the paper clashed with the colour of the answer, the subject's response was slower than when the colours were the same. An actual colour (the colour of the paper) could interfere with the colour of a number that existed only in her head (the answer to the mental arithmetic question). 'My research suggests that colour experiences coincide with the processing of meaning,' says Smilek. 'It's the concept of a number that's coloured.'

I So which is it? At present, we don't know, but in the future neurologists may be able to explain what's going on in the brains of people like the novelist Nabokov, who perceived the English 'a' as dark brown and the French 'e' as black.

Questions 27–30

Look at the following statements (Questions 27-30) and the list of people below.

Match each finding with the correct academic, **A**, **B**, **C** or **D**.

Choose the correct letter, **A**, **B**, **C** or **D**, in boxes 27-30.

NB *You may use any letter more than once.*

List of People

A Daniel Smilek

B John Locke

C Simon Baron-Cohen

D Vilyanur Ramachandran

	A	B	C	D
27 For synesthetes, hearing the names of things affects the brain in the same way that looking at things does.				
28 Synesthetes are consistent in their association of a certain colour with a certain written symbol.				
29 One synesthete heard a particular musical instrument when he saw a certain colour.				
30 Because synesthetes experience things differently to other people, studying synesthesia can give fresh perspectives on how the senses usually work.				

Questions 31–35

Reading Passage 3 has nine paragraphs, **A-I**.

Which paragraph contains the following information?

Choose the correct letter, **A-I**, in boxes **31-35**.

NB *You may use any letter more than once.*

	A	B	C	D	E	F	G	H	I
31 an investigation into synesthesia using modem medical technology									
32 a mention of a writer who was a synesthete									

33 a definition of synesthesia									
34 two different explanations of why synesthesia is uncommon in adults									
35 a reason why some synesthetes do not tell people about their experiences									

Questions 36–40

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

36 The painter Kandinsky admired synesthetes.

37 It is no longer believed that synesthesia is associated with mental illness.

38 Equal numbers of men and women have synesthesia.

39 Synesthetes have greater powers of logic than people with normal perception.

40 It is possible that we are all born with synesthesia.

TEST 4

The Pixar Story

The animation studio Pixar has experienced a number of challenges in its short history

A Between 2000 and 2005. under former Chief Executive Officer (CEO) Michael D. Eisner, Walt Disney Company set its shareholder meetings in a series of cold-weather cities during cold-weather months. Many suspected that this had been to discourage attendance by the company's increasingly restless shareholders. In 2006, however, there was no need for such measures. In October 2005, Chief Operating Officer Robert Iger had replaced Eisner as CEO. On taking charge. Iger had quickly carried out a bold stroke, negotiating a buyout of Pixar Animation Studios. Although the price was high, the acquisition proved to be overwhelmingly popular.

B Pixar had started life twenty years earlier as Pixar Inc., a computer hardware company, one of hundreds dotting the landscape of the San Francisco Bay Area in California. Within the company, a tiny animation group made short promotional films that brought in practically zero revenue; the group came close more than once to being shut down. When the Pixar Image Computer proved unprofitable. the company turned to selling animation software and making animated commercials, but it kept losing money year after year.

C In 1991. when Disney agreed to finance the production of Pixar's first feature film for cinema release. Disney had virtually dictated the terms of the contract. In late 1993. Disney considered ordering Pixar to shut down production of the John Lasseter directed film. Toy Story. on account of issues with the script. At the time, Hollywood commentators doubted whether audiences would even sit through a full-length film in the new medium of computer animation. It was unclear whether computer animation would prove to be a novelty that would quickly wear thin.

D Before long. however, things had changed dramatically. A succession of beloved and commercially successful animated feature films, starting with the 1995 release of Toy Story and including A Bug's Life and Finding Nemo, made Pixar the world's dominant animation studio. Disney made a fortune distributing the films. When Pixar's majority owner and CEO. Steve Jobs, cut off contract talks with Disney in early 2004, as the end of their distribution contract was in sight, the business press focused on the question of how Disney would cope. By then, it was Disney that seemed to need Pixar-the distribution of Pixar's films made up around 45% of the operating income from Disney's film operations. Disney's internal market research showed that mothers of young children trusted the Pixar brand more than Disney's.

E With the 2005 acquisition, John Lasseter was soon to hold the titles of Chief Creative Officer for Disney and Pixar animation and Principal Creative Advisor for Disney's worldwide theme parks and resorts. Having created a new genre of film with his colleagues at Pixar, Lasseter had been able to make the films he wanted to make, and he was coming back to Disney on his own terms, having briefly been an employee there when he was young.

F When Iger brought Lasseter on to speak at the 2006 shareholders' meeting. Lasseter was met with energetic applause as the sound system played a few bars of the signature song of Toy Story. In his speech, Lasseter recalled afternoons as a schoolboy running home to catch Bugs Bunny cartoons on TV. It wasn't long. he told the audience, before he realized he wanted to earn a living from making cartoons. He went on to talk about working on the Jungle Cruise ride in Disneyland, and the terrible jokes that he and his fellow operator told to enliven the show. He said the experience had brought him out of his shell and given him confidence in front of people. He also explained how he joined Disney's animation division fresh out of the California Institute of the Arts, and saw one of the early trials of 3-D computer animation. He mentioned the disappointment he had felt as a young man in trying. and failing. to get the Disney studio to embrace the new technology. Keeping his presentation upbeat, he said simply. 'So I followed my dream to work with one of the most amazing people I've ever known in my life-Ed Catmull.'

G The sixty-one-year-old president of Pixar, Dr. Edwin Catmull, was seated amongst the shareholders. Catmull has been a computer graphics researcher who had fallen accidentally into the role of business leader. Those who knew him well invariably described him as brilliant, but his intelligence was not the kind that advertised itself by dominating conversations; by and large, he was keener on listening than talking. When he did speak, his words were friendly and polite.

H While Catmull had built upon the work of others, the revolution in 3-D animation was in many respects his revolution. It was Catmull who had held to his vision of fully computer-animated movies. And it was Catmull, while running computer graphics labs at the New York Institute of Technology and George Lucas's Lucasfilm, who had assembled the technical and creative staff that would go on to become the heart of Pixar Animation Studios.

Questions 1–6

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

1 Robert Iger had a low opinion of Michael D. Eisner.

2 Pixar Inc. had extremely limited financial success in its early years.

3 There were difficulties during the production of the film Toy Story.

4 In the early 1990s, Hollywood commentators were convinced animated films had a promising future.

5 Finding Nemo was more popular than Toy Story.

6 In 2004, Pixar contributed little to Disney's income from its film operations.

Questions 7–13

Complete the notes below.

Write **ONE WORD ONLY** from the passage for each answer.

Lasseter and Catmull – a professional success story

John Lasseter

- was keen on watching Bugs Bunny cartoons when he was a schoolboy
- worked as a ride (7)____________________ at Disneyland which increased his (8)_____________________
- attended California Institute of the Arts
- suffered (9)________________________ over rejection of new technology by Disney studio

Ed Catmull

- was Pixar's (10)______________________ at time of shareholder meeting in 2006
- preferred (11)______________________ to taking control of conversations
- did not let go of his (12)________________________ for computer animated films
- ran various computer graphics laboratories
- brought together the various teams on which the (13)____________________ of Pixar would be founded

A mechanical friend for children

A. The development of robots that interact socially with people and assist them in everyday life has been an elusive goal of modern science. Despite impressive advances in the mechanical aspects of this problem, producing robots that bond and socialize with people for sustained periods of time has proven difficult. The most successful robots so far have been storytellers, but they have only been able to maintain human interest for a limited time and typically rely on the robot telling stories that change over time. In practice, commercially available robots seldom cross the 10-hour barrier (i.e. individual users tend to spend less than a combined total of 10 hours with the robots before losing interest). This observation is in sharp contrast to the long-term interactions and bonding that commonly develop between humans and their pets.

B. In a recent study, researchers from the Institute for Neural Computation in California introduced a state-of-the-art social robot into a classroom of 18- to 24-month-olds for five months as a way of studying human/robot interactions. The researchers, including Fumihide Tanaka and Javier R Movellan, introduced a toddler-sized humanoid robot into a classroom at a childhood education center. One of the QRIO series of robots, the 58cm machine, was originally developed by Sony. Children of toddler age were chosen because they have no preconceived notions of robots, according to Tanaka. One of the goals of the study was to establish whether it was possible for social robots to maintain the interest of children beyond the 10-hour barrier.

C. The researchers sent instructions to the robot about every two minutes to do things like giggle, dance, sit down, fall down or walk in a certain direction. The 45 sessions were videotaped, and interactions between toddlers and the robot were later analyzed. The results showed that the quality of those interactions improved steadily over 27 sessions. The interactions deteriorated quickly over the next 15 sessions, when the robot was ordered to behave in a more limited, predictable manner. Finally, the human/robot relations improved in the last three sessions, after the robot had been instructed to display its full range of behaviors.

D. 'Initially the children treated the robot very differently from the way they treated each other,' Tanaka said. 'Early in the study some children cried when QRIO fell. But a month into the study, the toddlers helped QRIO stand up by pushing its back or pulling its hands.' The most important aspect of interaction was touch, Tanaka said. At first the toddlers would touch the robot on its face, but later on they would touch it only on its hands and arms, like they would with other humans. Another robot-like toy named Robby, which resembled QRIO but did not move, was used as a control in the study. While hugging of QRIO increased, hugging of Robby decreased throughout the study. Furthermore, when QRIO laid down on the floor as its batteries ran down, a toddler would put a blanket over his silver-colored 'friend' and say 'night-night'. Care-taking behaviors were frequently observed toward QRIO but seldom toward Robby.

E. The study concluded that after 45 days of immersion in a childcare center over a period of five months, long-term bonding and socialization occurred between toddlers and a state-of-the-art social robot. Overall, the interaction between children and the robot improved over time and the children progressively treated it more as a peer than a plaything. 'To my knowledge, this is the first long-term study of this sort,' said Ronald Arkin, a roboticist at the Georgia Institute of Technology in the US.

F. Tanaka and Movellan are now developing autonomous robots for the toddler classroom. 'It could have great potential in educational settings assisting teachers and enriching the classroom environment,' Tanaka said. The researchers hope that more advanced versions of robots like QRIO could become personalized tutors to assist teachers in classrooms. A robotic tutor could react on the spot to social cues and approximate social skills like facial expression and eye gaze, they said. 'It is becoming clear that, to achieve this goal, we are going to [need to] endow machines with something similar to emotion, not just traditional forms of intelligence,' said Movellan.

G. Associate professor David Powers, an expert in artificial intelligence and cognitive science at Flinders University in South Australia, commented, 'In this study it is clearly demonstrated that limited range of robot behaviors, however impressive, is nowhere near as important to human/robot interaction as being able to make appropriate responses from a broad repertoire of behaviors'. Ronald Arkin was not surprised by the affection demonstrated by the toddlers toward the robot. 'Humans have a tremendous propensity to bond with artifacts, whether it be a car, a doll, or a robot,' he said. But he also cautioned that researchers do not yet understand the consequences of increased human/robot interaction. 'Studying how robots and humans work together can give us insight into whether this is a good thing or a bad thing for society,' Arkin said. 'We need to find out what the consequences are of introducing a robot into a cadre of children. How will that enhance, or potentially interfere with, their social development? Do we really understand the long-term impact of having a robot as a childhood friend?'

Questions 14–18

Reading Passage 2 has seven paragraphs, **A-G**.

Which paragraph contains the following information?

Choose the correct letter, **A-G**, in boxes 14-18.

NB *You may use any letter more than once.*

	A	B	C	D	E	F	G
14 a comparison of children's reactions towards different robots							
15 a speculation about ways robots may be able to communicate							
16 a description of changes in the way the children physically handled a robot							
17 a comparison between people's connections with animals and their connections with robots							
18 an account of the way one robot was programmed							

Questions 19–23

Look at the following statements (Questions 19-23) and the list of people below.

Match each statement with the correct person, **A-D**.

Choose the correct letter, **A-D**, in boxes 20-23.

NB *You may use any letter more than once.*

List of People

A Fumihide Tanaka

B Javier R Movellan

C Ronald Arkin

D David Powers

	A	B	C	D
19 In future, robots will not only have to think, but also to show feelings.				
20 It is uncertain whether more contact between people and robots will be beneficial.				
21 Very young children have not yet developed ideas about robots.				
22 Robots need to perform a wide variety of actions for people to relate to them.				
23 Using robots as an aid in schools may have many benefits.				

Questions 24–26

Complete the sentences below.

Write **ONE WORD ONLY** from the passage for each answer.

Until recently, robots that were best at holding people's attention were those that acted as (24)________________________

The children responded to the QRIO robot as a friend or (25)_________________________, rather than as a toy.

Arkin expected that the children would show (26)________________________ towards the QRIO robot.

The peopling of Patagonia

Anthropologists continue to investigate human migration to Patagonia at the southern tip of South America

A. The human settlement of the southern extremity of the Americas has always fascinated pre-historians. Viewed from a global perspective, this was the last major continental land mass to be reached by human beings. The earliest occupation of Patagonia carries obvious implications for understanding when the North and South American continents were peopled, because it gives a baseline that all calculations regrading the rate of dispersion of humans throughout both continents must take into account.

B. For many years the human settlement of North and South America has been conceived of as beginning in the far north and travelling progressively southwards to Patagonia. However, fundamental disagreements developed concerning the length of time involved. Some scholars accepted a human presence in the Americas as early as 20,000 years ago, while others proposed that it could date no earlier than 8,000 years ago, and the debate is still with us today.

C. The idea of a relatively 'late' settlement of the Americas (around 8,000 years ago) implies that a rapid process of migration took place. Herein lies a second debate which revolves around the question of how migration is to be understood. The 'late' model demands a hypothetical migration conceived of as a single continually advancing wave of settlement. This has always been difficult to take seriously and many scholars now support the idea of an 'early' model that sees the migration as a less ordered migration, and this is surely the most realistic scenario as migrants slowly adapted to the diverse natural habitats they would have met while travelling through the continent.

D. Those who argue for an earlier settlement, however, must contend with the lack of unequivocal evidence for archaeological sites older than around 14,000 years. Nevertheless, evidence for human occupation of the centre of South America is now securely dated to around 12,500 years ago at the Monte Verde site, which casts doubt on the 'late' model. The lack of archaeological evidence further south for this time period may be explained by the obstacle to humans on foot posed by the huge glacial streams that were present at that time.

E. We can speculate then that the retreat of the Patagonian glaciers around 14,000 years ago allowed the initial human intrusion into a pristine environment, which was similar to that of early post-glacial Europe. Human settlement of the vast horizontal expanse of treeless high country must have been tenuous at best, and the evidence for this occupation remains relatively scant, most of it coming from rock shelters in Argentina and Chile. There is, however, reliable evidence from these sites to confirm the presence of humans by around 11,000 years ago in different habitats and some hints of an even older occupation. However, some other sites where evidence for even earlier human occupation was initially posited, have recently come under fresh scrutiny. This is because anthropologists have come to recognise that bones or other evidence may be deposited in caves by natural agency, in other words by other forces such as floods or predators, and not necessarily by humans.

F. We shall turn now to a more detailed discussion of the archaeological evidence found in various parts of Patagonia. At the site located beside Chinchihuapi Creek, excavations have produced convincing evidence of human occupation, including hut foundations and wooden artefacts. They were buried in layers of peat, which has the property of preserving wood remarkably well, and as a result **radiocarbon dating*** tests have shown these artefacts to date from around 12,500 years ago. One of the most famous Patagonian sites is a cave known as Los Toldos. However, the evidence from this site has recently been called into question, because dispersed flecks of carbon used in the test process were taken unsystematically from many different places in the site. As a result, the association of this material with the artefacts is not at all clear. About 150 kilometres south is the site called El Ceibo, where a similar collection of artefacts to that found at Los Toldos has been discovered from the lowest levels of the dig, but as yet no radiocarbon dates are available and this sort of analysis of the existing evidence is required before the site's value can be confirmed.

G. The Arroyo Feo site is located very close to the high plateau. The artefacts from the earliest occupations were found at the same depth and have the same origins as those from Los Toldos, and have been securely dated to around 9,000 years ago. Another site that is mentioned in the debate is at Las Buitreras, where a number of stone flakes associated with bone remains of various animals have been discovered. However, anthropologists now believe that presumed cut marks on the bones are somewhat dubious, and despite detailed testing there is no way of securely relating any of these remains with human occupation. Finally some 50 kilometres to the south is the site at Cueva Fell, which was the first Patagonian site to be systematically studied by modern archaeological methods. However, it is now recognised that the utility of this site must be restricted to its direct vicinity, given changes to the nearby area caused by flooding, and findings cannot be freely extrapolated further afield.

H. In conclusion, based on the evidence from a number of reliable sites, it seems probable that human populations reached Patagonia around 11,000 years ago.

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radiocarbon dating: finding out the age of an organic object by examining carbon it contains

Questions 27–31

Choose the correct answer.

27 In the first paragraph, what is the writer's main point about migration to Patagonia?

- It started earlier than previously thought.
- Historians have overlooked its importance.
- It impacts on research into the wider region.
- Researchers have calculated its effects on the environment.

28 In the second paragraph, what is the writer's purpose?

- to challenge previous research

- to propose new areas to investigate
- to summarise a scholarly debate
- to suggest reasons for human migration

29 The writer refers to the 'late' model in order to

- compare it with another theory of migration.
- evaluate the success of American migration.
- criticise the speed of research into migration.
- compare migration in different parts of the world.

30 What is the writer's main point about the 'early' model?

- Scholars support the idea of fast migrations.
- It is too random to be convincing theory.
- South America was more habitable at an earlier time.
- It is more consistent with the physical conditions of the land.

31 What does the writer suggest about the Monte Verde site?

- It is much younger than researchers once estimated.
- It provides supporting evidence for relatively early settlement
- Archaeologists believe the site is of questionable value.
- Streams exposed the site, making new research possible.

Questions 32–35

Choose **YES** if the statement agrees with the claims of the writer, choose **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

32 The conditions encountered by the first migrants to Patagonia were unique.

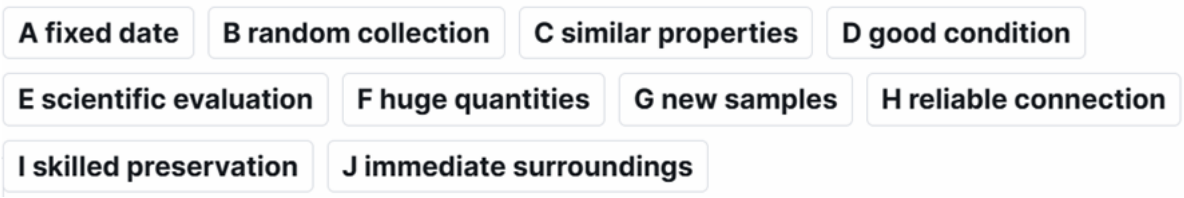
33 In the high country the first migrants hunted wild animals for food.

34 Archaeologists have failed to draw conclusions from the evidence found at rock shelters in Argentina and Chile.

35 Archaeological evidence can be moved from place to place in a variety of ways.

Questions 36–40

Complete the summary using the list of words, **A-J**, below.



A fixed date
B random collection
C similar properties
D good condition
E scientific evaluation
F huge quantities
G new samples
H reliable connection
I skilled preservation
J immediate surroundings

The archaeological evidence from Patagonia

Building remains and other evidence have been found in (36)________ at the Chinchihuapi Creek site, and because of this it has been possible to date them to around 12,500 years ago. However, the (37)__________ of the sample taken from Los Toldos means that this site is of doubtful value. El Ceibo is a more promising dig, where the examination of artefacts would be beneficial in order to confirm the usefulness of discoveries there. The remains found at the Arroyo Feo site show (38)_________ and date from around 9,000 years ago. Unfortunately, no (39)_________ can be made between the samples taken from Las Buitreras and human presence. The findings of the work carried out at Cueva Fell cannot provide useful information beyond the (40)__________**.** In conclusion, though the evidence is mixed, it is believed that human population of Patagonia began about 11,000 years ago.

TEST 5

Western Immigration of Canada

ix Demand of western immigration

By the mid-1870s Canada wanted an immigrant population of agricultural settlers established in the West. No urban centres existed on the prairies in the 1870s, and rural settlement was the focus of the federal government's attention. The western rural settlement was desired, as it would provide homesteads for the sons and daughters of eastern farmers, as eastern agricultural land filled to capacity. As well, eastern farmers and politicians viewed western Canada, with its broad expanses of unpopulated land, as a prime location for expanding Canada's agricultural output, especially in terms of wheat production to serve the markets of eastern Canada.

(1)_____________________

To bolster Canada's population and agricultural output, the federal government took steps to secure western land. The Dominion of Canada purchased Rupert's Land from the Hudson's Bay Company in 1870. In 1872, the federal government enacted the Dominion Lands Act. This act enabled settlers to acquire 160 acres of free land, as long as settlers remained on their land for a period of three years, made certain minor improvements to the land, and paid a $10.00 registration fee. The Canadian government also created a Mounted Police Force in 1873. The Mounties journeyed west to secure the area for future settlers. By 1876 the NWMP had established themselves in the West. The major posts included Swan River, Fort Saskatchewan, Fort Calgary, Fort Walsh and Fort Macleod. All of these initiatives attracted a number of Eastern-Canadian settlers, as well as European and American immigrants, to Canada's West, and particularly to the area of Manitoba.

(2)_____________________

The surest way to protect Canadian territory, and to achieve the secondary goal for joining British Columbia to the rest of the country, was to import large numbers of Eastern Canadian and British settlers. Settling the West also made imperative the building of a transcontinental railway. The railway would work to create an east-west economy, in which western Canada would feed the growing urban industrial population of the east, and in return become a market for eastern Canadian manufactured goods.

(3)_____________________

Winnipeg became the metropolis of the West during this period. Winnipeg's growth before 1900 was the result of a combination of land speculation, growth of housing starts, and the federal government's solution in 1881 of Winnipeg as a major stop along the CPR. This decision culminated in a land boom between 1881 and 1883 which resulted in the transformation of hamlets like Portage la Prairie and Brandon into towns, and a large increase in Manitoba's population. Soon, Winnipeg stood at the junction of three transcontinental railway lines which employed thousands in rail yards. Winnipeg also became the major processor of agricultural products for the surrounding hinterland.

(4)____________________

The majority of settlers to Winnipeg, and the surrounding countryside, during this early period, were primarily Protestant English-speaking settlers from Ontario and the British Isles. These settlers established Winnipeg upon a British-Ontarian ethos which came to dominate the society's social, political, and economic spirit. This British-Ontarian ethnic homogeneity, however, did not last very long. Increasing numbers of foreign immigrants, especially from Austria-Hungary and Ukraine soon added a new ethnic element to the recent British, the older First Nation Métis, and Selkirk's settler population base. Settling the West with (in particular) Eastern Canadians and British immigrant offered the advantage of safeguarding the 49th parallel from the threat of American take-over, had not the Minnesota legislature passed a resolution which provided for the annexation of the Red River district. The Red River in 1870 was the most important settlement on the Canadian prairies. It contained 11,963 inhabitants of whom 9,700 were Métis and First Nations. But neighbouring Minnesota already had a population of over 100,000.

(5)____________________

Not all of the settlers who came to western Canada in the 1880s, however, desired to remain there. In the 1870s and 1880s, economic depression kept the value of Canada's staple exports low, which discouraged many from permanent settlement in the West. Countries including Brazil, Argentina, Australia, New Zealand and the United States competed with Canada for immigrants. Many immigrants and thousands of Canadians chose to settle in the accessible and attractive American frontier. Canada before 1891 has been called “a huge demographic railway station” where thousands of men, women, and children were constantly going and coming, and where the number of departures invariably exceeded that of arrivals.”

(6)____________________

By 1891 Eastern Canada had its share of both large urban centres and problems associated with city life. While the booming economic centres of Toronto and Montreal were complete with electricity and telephones in the cities' wealthiest areas by the turn of the century, slum conditions characterised the poorest areas like the district known as ‘the Ward’ in Toronto. Chickens and pigs ran through the streets; privy buckets spilled onto backyards and lanes creating cesspools in urban slums. These same social reformers believed that rural living, in stark contrast to urban, would lead to a healthy, moral, and charitable way of life. Social reformers praised the ability of fresh air, hard work, and open spaces for ‘Canadianizing’ immigrants. Agricultural pursuits were seen as especially fitting for attaining this ‘moral’ and family-oriented way of life, in opposition to the single male-dominated atmosphere of the cities. Certainly, agriculture played an important part in the Canadian economy in 1891. One-third of the workforce worked on farms.

(7)____________________

The Canadian government presented Canada's attractions to potential overseas migrants in several ways. The government offered free or cheap land to potential agriculturists. As well, the government established agents and/or agencies for the purpose of attracting emigrants overseas. Assisted passage schemes, bonuses and commissions to agents and settlers and pamphlets also attracted some immigrants to Canada. The most influential form of attracting others to Canada, however, remained the letters home written by emigrants already in

Canada. Letters from trusted friends and family members. Letters home often contained exaggerations of the ‘wonder of the new world.’ Migrant workers and settlers already in Canada did not want to disappoint, or worry, their family and friends at home. Embellished tales of good fortune and happiness often succeeded in encouraging others to come.

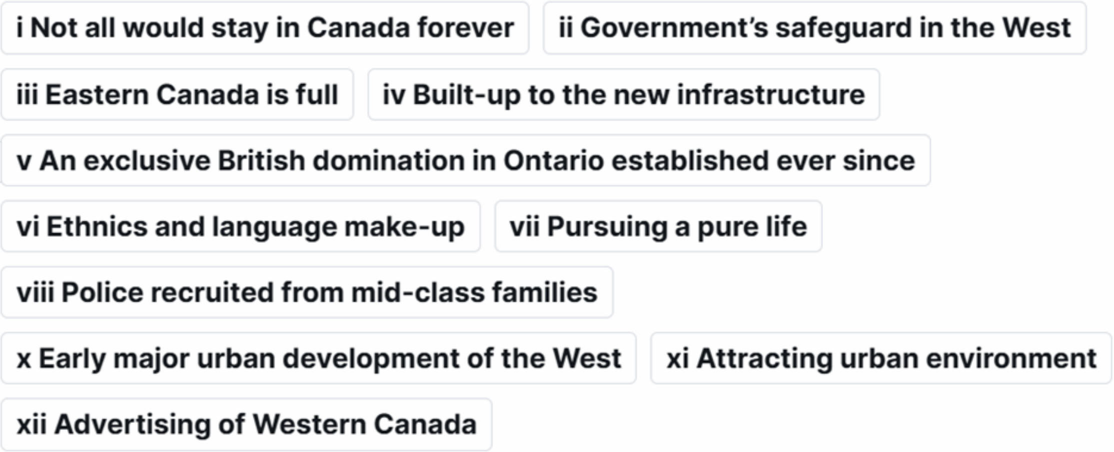
Questions 1–7

The Reading Passage has eight paragraphs.

Choose the correct heading from the list below.

Choose the correct number, **i-xii**, in boxes **1-7**.

List of Headings



i Not all would stay in Canada forever

ii Government’s safeguard in the West

iii Eastern Canada is full

iv Built-up to the new infrastructure

v An exclusive British domination in Ontario established ever since

vi Ethnics and language make-up

vii Pursuing a pure life

viii Police recruited from mid-class families

x Early major urban development of the West

xi Attracting urban environment

xii Advertising of Western Canada

Questions 8–13

Complete the following summary of the paragraphs of Reading Passage.

Using **NO MORE THAN TWO WORDS** from the Reading Passage for each answer.

With the saturation of Eastern Canada, the Western rural area would supply (8)____________________________ for the descendants of easterners. Politicians also declared that Western has got potential to increase (9)_________________________ of Canada according to (10)____________________________ crop that consumed in the East. The federal government started to prepare and made it happen. First, the government bought land from a private (11)____________________________, and legally offered a certain area to people who stayed for a qualifying period of time. Then, mounted (12)_______________________ was found to secure the land. However, the best way to protect citizens was to build a (13)____________________________ to transport the migrants and goods between the West and the East.

Why don't we sleep?

A Fifty-six million prescriptions for sleeping medication were handed out by doctors in America last year. Yet remarkably little is being done to understand insomnia's root causes. Socially and economically, the undertreatment of sleeplessness is hugely expensive. The Institute of Medicine, an independent scientific advisory group, estimates nearly 20 percent of all major accidents on the road are associated with driver sleepiness. The loss in terms of productivity within the workplace is even higher, costing billions. Then there are the softer costs which remain unmeasured but still exist; for example, the damaged relationships with others. If other medical problems were causing such widespread harm, governments would act, but US authorities contribute only about $230 million a year for the funding of sleep research, comparable to the amount that the manufacturers of popular sleeping pills spent in three months on advertising. Currently most medical school students get no more than four hours of training on sleep disorders; some get none.

B If we don't know why we can't sleep, it's in part because we don't really know why we need to sleep in the first place. We know that we divide it between periods of deep-wave sleep and rapid eye movement (REM) sleep, when the brain is as active as when we're awake, but our voluntary muscles are paralyzed. We know that all mammals sleep, and that there are some insects and reptiles that only half sleep, in order to remain aware of their environment and predators.

C The predominant theory of sleep is that the brain demands it. Recently, researchers at Harvard, led by Robert Stickgold, tested undergraduates on various aptitude tests, allowed them to nap, then tested them again. They found that those who had engaged in REM sleep subsequently performed better in pattern recognition tasks, such as grammar, while those who slept deeply were better at memorization.

D Such studies suggest that memory consolidation may be one function of sleep. Giulio Tononi, a sleep researcher at the University of Wisconsin, published an interesting twist on this theory a few years ago. His study showed that the sleeping brain seems to delete redundant or unnecessary synapses or connections. So the purpose of sleep may be to help us remember what's important, by letting us forget what's not.

E Sleep is likely to have physiological purposes too. Some researchers have found that sleep deprivation impedes wound healing in rats, and others have suggested that sleep helps boost the immune system and control infection. But these studies are not conclusive. At Stanford University, William Dement, co-founder of the Stanford Sleep Medicine Center, explains what he knows after 50 years of research, about the reason we sleep. 'As far as I know,' he said, 'the only reason we need to sleep that is really, really solid is because we get sleepy.'

F The Stanford clinic does more than 3,000 overnight sleep studies a year. Their main diagnostic tool is the polysomnogram, the main element of which is the electroencephalograph (EEG), which captures the electrical output from a patient's brain. As the EEG records a person's sleep patterns, the polysomnogram technicians also measure body temperature, muscle activity, eye movement, and breathing. Then they look over the data for signs of abnormal sleep. When a person has narcolepsy, for instance, they plunge from wakefulness into REM sleep without any intermediate steps. However, Clete Kushida, the clinic director, told me he can spot most people's sleep problems right at the intake interview. 'There are those who cannot keep their eyes open, and those who just speak of their exhaustion but don't actually fall asleep. The former often have sleep apnea where they stop breathing. The latter have true insomnia.'

G In sleep apnea, muscle relaxation allows the soft tissue of the throat to close, shutting off the sleeper's air passage. When the brain realizes it is not getting oxygen, it sends a signal to the body to wake up. The sleeper awakes, inhales, and sleep returns. Apnea is a serious problem but only indirectly a sleep disease. True insomniacs are people who either can't get to, or can't stay asleep for any evident reason.

H While apnea can be treated with a device that forces air down the sleeper's throat to keep the airways open, the treatment of classic insomnia is not so clear cut. Acupuncture may help. It has long had this role in Asian medicine and is being studied at the University of Pittsburgh sleep center now. Typically in the US, insomnia is treated in two ways. First come the sleeping pills. Though safer than they once were, they can still lead to psychological addiction. 'Many users complain that their sleeping-pill sleep seems different, and they feel unfocussed on waking. Sleeping pills are not a natural way to sleep,' points out Charles Czeisler, director of the Harvard Health and Safety Group.

I The second step in treating insomniacs is usually cognitive behavioral therapy (CBT). In CBT, a psychologist teaches insomniacs to think about sleep problems as manageable, and to practice good 'sleep hygiene': sleep in a dark room, go to bed only when you are sleepy, don't exercise beforehand. Studies have shown that CBT is more effective than sleeping pills at treating long-term insomnia, but many sufferers aren't convinced. 'Some people continue in my experience to struggle,' says John Winkelman, another sleep center director. 'They' re not super-satisfied with their sleep.'

Questions 14–17

Complete the summary below.

Write **ONE WORD ONLY** from the passage for each answer.

Insomnia in the USA

Last year the high number of (14)____________________ doctors gave their patients highlights the fact that insomnia is a serious issue in the USA. It is evidently responsible for a number of serious traffic (15)________________________ and has a considerable effect on company (16)___________________. A lack of sleep can also have a harmful effect on different relationships, although there are no statistics on this.

Unfortunately, there is insufficient official funding given to research into sleep problems, and the (17)______________________ given at medical school is also insufficient to deal with insomnia.

Questions 18–23

Reading Passage 2 has nine paragraphs, **A-I**.

Which paragraph contains the following information?

Choose the correct letter, **A-I**, in boxes 18-23.

	A	B	C	D	E	F	G	H	I
18 a mention of different cultural approaches to dealing with insomnia									
19 indications that sleep has a positive effect on health									
20 the effects of different kinds of sleep on mental performance									
21 reasons why various species of animal sleep in different ways									
22 the suggestion that sleep allows us to get rid of insignificant information									
23 a description of how the brain responds when a person stops breathing									

Questions 24–26

Look at the following statements (Questions 24-26) and the list of people below.

Match each statement with the correct person, **A-E**.

Choose the correct letter, **A-E**, in boxes 24-26.

List of People

A	Giulio Tononi
B	William Dement
C	Clete Kushida
D	Charles Czeisler
E	John Winkelman

	A	B	C	D	E
24 Research tells us that we sleep as reaction to our body's signals.					
25 People suffering from insomnia are easily recognisable.					
26 Therapy does not always enable people to achieve good quality sleep.					

Understanding symbols

Judy DeLoache describes her research into the difficulties children experience with symbols

A. About 20 years ago I had one of those wonderful moments when research takes an unexpected but fruitful turn. I had been studying toddler memory and was beginning a new experiment with two-and-a-half- and three-year-olds. For the project, I had built a model of a room that was in my laboratory. The real space contained basic furniture such as a couch and table. The miniature version was as similar as possible to its larger counterpart: the furniture was the same shape and material and was arranged in the same position. For the study, a child watched as we hid a miniature toy – a plastic dog we called Little Snoopy* – in the model. We then encouraged the child to find 'Big Snoopy, a large version of the toy 'hiding in the same place in his big room.'

B. The three-year-olds were very successful. After they observed the small toy being placed behind the miniature couch, they ran into the room and found the large toy behind the real couch. But the two-and-a-half-year-olds failed abysmally. They cheerfully ran into the room to retrieve the large toy, but most had no idea where to look, even though they remembered where the tiny toy was hidden in the miniature room and could readily find it there.

C. Their failure to use what they knew about the model to draw an inference about the real room indicated that they did not appreciate the relation between the model and the room. I realised my memory study was instead a study of symbolic understanding and that the children's failure might be telling us something about how and when children acquire the ability to understand that one object stands for another.

D. The first type of symbolic object that infants and young children master is the picture. No symbols seem simpler to adults, but infants initially find pictures perplexing. The problem stems from the duality inherent in all symbolic objects: they are real in themselves and also representations of something else. A few years ago I became intrigued by anecdotes suggesting that infants do not appreciate this duality-stories of a baby trying to pick up a depicted toy or fit a foot into a photograph of a shoe. We assumed such behaviour would be rare and therefore difficult to study.

E. Fortunately we were wrong. We began testing infants' understanding of pictures by putting a book of highly realistic colour photographs of individual objects in front of nine-month-olds. To our surprise, every child in the study reached out to feel or scratch the pictures. The confusion seems to be conceptual not perceptual. Infants can perfectly well perceive the difference between objects and pictures and given the choice they will choose the real thing. But they do not yet fully understand what pictures are and how they differ from real objects. However, when depicted objects bear little resemblance to the real thing – as in a black and white drawing – infants rarely explore them. By 18 months, babies have come to appreciate that a picture merely represents an object; instead of manipulating the paper, they point to pictures and name objects. Nevertheless, it takes several years for the nature of pictures to be completely understood.

F. Studies have shown that, until the age of four, many children think that turning a picture of a bowl of popcorn upside down will result in the depicted popcorn falling out of the bowl.

G. Pictures are not the only source of confusion for very young children. In a third experiment, we brought a group of toddlers (18-to 30-month-old children) Into a room containing a child's slide, a chair, and a toddler-sized car. The children played with these for a while. Then we secretly replaced each object with an identical miniature version. Most children attempted to perform the same actions with the miniature items that they had with the larger ones. Some tried to sit on the chair, others attempted to climb into the car. Interestingly, most of the children showed little or no reaction to their failed attempts. We think this probably reflects the fact that toddlers' daily lives are full of unsuccessful attempts to do one thing or another. This confusion has implications for educational practice. Teachers everywhere use blocks or other objects to represent numerical quantity. However, if young children do not understand the relation between an object and what it represents, this could be counterproductive. To demonstrate this, we taught six-and seven-year-olds a difficult subtraction problem using blocks.

H. We taught an identical comparison group the same concept, but using pencil and paper. Both groups learned to solve the problems equally well, but the group using blocks took three times as long to do so.

I. Dual representation also comes into play in many children's books. Modern children's books are often 3D, with features that encourage children to interact directly with the book itself, for example flaps that can be lifted to reveal pictures. Graduate student Cynthia Chong and I reasoned that these features might distract children from the information. Accordingly, we used different types of books to teach letters to 30-month-old children. One was a simple old-fashioned alphabet book with each letter accompanied by an appropriate picture. The other was a 3-D version. The children using the traditional book subsequently recognised more letters than those using the 3-D book.

J. Presumably, the children could concentrate more easily with the plain 2-D book, whereas with the other one they were distracted by the 3-D activities. Less may be more when it comes to educational books for young children.

Questions 27–32

Choose the correct answer.

27 In the first paragraph, what did the children in the experiment have to do?

- spot the differences between a real room and a smaller version
- make a copy of a life-sized room using small furniture
- hide a large toy in a tiny room
- locate a toy in a life-sized room

28 What was the result of the first experiment?

- Both two-and-a-half-and three-year-olds completed the task successfully.
- Three-year-olds could mentally relate the two rooms they had been shown.
- Two-and-a-half-year-olds could relate more closely to the toys as symbols.
- Two-and-a-half-year-olds had poorer memory than three-year-olds.

29 In the fourth paragraph, what does the writer say about children and pictures?

- Infants are unable to understand that pictures serve a double purpose.
- Young children may understand pictures more readily than adults.
- Infants can understand that a picture of food cannot be eaten.
- Adults should encourage children to look at pictures from an early age.

30 In the third experiment, what did the writer notice about the reactions of the toddlers?

- They often behaved in an unpredictable way.
- They were only comfortable performing very familiar tasks.
- They became frustrated when they could not achieve a task.
- They behaved the same whether they were successful or not.

31 What did the experiment involving a mathematical problem suggest about children's learning?

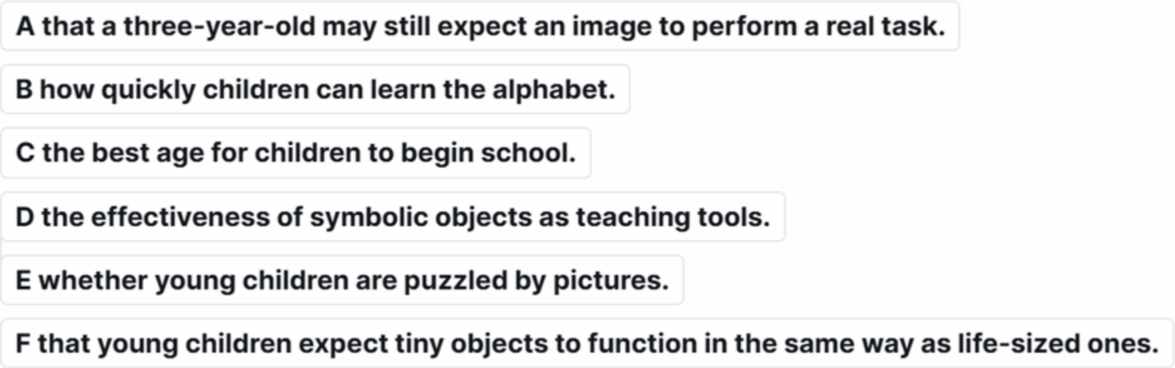
- Children are able to understand complex concepts at an early age.
- Children younger than seven cannot learn using pencil and paper alone.
- Using blocks can make it harder for children to learn new concepts.
- Teachers should try using blocks to teach mathematics to lower level students.

32 What does Deloache conclude about the results of her and Chong's experiment?

- Children's books should be more interactive.
- 2-D books should contain realistic images.
- Simpler books may be better learning tools.
- 3-D books help weaker students to progress.

Questions 33–35

Complete each sentence with the correct ending, **A-F**, below.



A that a three-year-old may still expect an image to perform a real task.

B how quickly children can learn the alphabet.

C the best age for children to begin school.

D the effectiveness of symbolic objects as teaching tools.

E whether young children are puzzled by pictures.

F that young children expect tiny objects to function in the same way as life-sized ones.

The test involving 9-month-old babies attempted to find out (33)_________

The third experiment revealed (34)__________

The maths experiment was designed to access (35)_________

Questions 36–40

Choose **YES** if the statement agrees with the claims of the writer, choose **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

36 The results of the first experiment revealed unexpected information.

37 Infants react the same way to both drawings and photographs.

38 Toddlers are used to failing in many of the tasks they try to perform.

39 The confusion of symbols and real objects has little significance for educational practice.

40 Children enjoy reading 3-D books more than 2-D books.

TEST 6

Optimism and Health

If you have a positive outlook, the likelihood is that you will lead a longer life. John Nash examines the link between optimism and good health

Medical studies are concluding that optimists really do have something to be cheerful about. Coincidental links between Optimism and improved general health have been found by researchers. Recently, a Yale University psychologists' study of 660 volunteers aged 50 and above was published. It found that thinking positively about ageing adds an average of seven years to a person's life. The team, led by Dr Becca Levy, suggests that having an optimistic attitude can bolster the will to live, though they admit that they cannot explain it fully.

Another American research team, however, says they have identified a physical mechanism behind the phenomenon. Their eight-year study of 670 men aged about 63 found that the optimists had significantly better lung function than men who were more pessimistic. This is the first study to show such a link. The research team at Brigham & Women's Hospital and Harvard Medical School believes that attitude somehow strengthens the immune system, and that adopting a more positive outlook may reverse physical decline. 'Preliminary studies on heart patients suggest that by changing a person's outlook, you can improve their mortality risk,' Says Dr Rosalind Wright.

The role of optimism in good health has long been noted but often sidelined. Sigmund Freud, the influential psychologist. optimism with ignorance. and from 1970 to 2000 there were 46,000 psychology papers on depression and only 40 on joy.

Part of that negativity may be blamed on optimists themselves. They are not necessarily fun to have around, Says Brice Pitt, the Emeritus Professor of the Psychiatry of Old Age at Imperial College, London. 'Optimists tend to be insufferable people. Always jolly, always up, and, frankly, they have a hopelessly rosy outlook' he says. 'Depressive people see things as they really are, and that is a disadvantage from an evolutionary point of view. Optimism is a piece of evolutionary equipment that has carried us a long way through millennia of setbacks.'

Studies show that optimists do better than pessimists in work, school and sports: suffer less depression, achieve more goals, respond better to stress and fight disease better. Among people aged from their mid-nineties into their hundreds, researchers generally fail to find consistencies in diet or exercise (and some still smoke). What the super-aged do tend to share, however, is a Positive, optimistic outlook.

Toshihiko Maruta, of the Mayo Institute, headed an earlier American medical study to find a link between optimism and longevity. Her study found that optimists live about 19 per cent longer than people with grim outlooks. 'It tells us that mind and body are linked and that attitude has an impact on the final outcome: death,' she says. That simple message might have far more effect than exhortations to eat fresh fruit and warnings to stay out of the sun.

Despite the benefits of unprecedented material wealth, the World Health Organisation estimates that depression is soon to become the second leading cause of disability. Popular wisdom blames this on our frenetically busy society. According to social forecasters at the Henley Centre, while people in developed countries are 65 per cent better off financially today than they were 15 years ago, there is no evidence that they are any more content with their lives. While much of this is down to the perception among many of being rushed and pressured for time and space, it is the perception not the reality that counts, they say.

The Henley researchers found that if people think they have enough time, space or money, they feel more relaxed about life, regardless of how much of these things they actually have. ‘In terms of money, some of the people who “feel” wealthiest, and some of those who “feel” poorest, actually have almost the same amount of money at their disposal. Their attitudes and behaviour patterns, however, are different from one another,’ says Chad Wallens, a researcher.

Few studies have tried to ascertain the proportion of optimists in the world. But a 1995 nationwide survey conducted in the USA for the American magazine Adweek found that about half the population counted themselves as optimists, with women slightly more apt than men (53 per cent versus 48 per cent) to identify themselves thus. That attitude drops, however, to less than a third of people between the ages of 55 and 64, which supports research showing that men, in particular, tend to become more irritable as they get older. Lynn Myers, a psychotherapist, points out. however, that too much optimism can be a bad thing: ‘You can be what is called a cock-eyed optimist, the sort of person who smokes but is convinced they will never get lung cancer.’ Curiously, though, the Brigham & Women's Hospital study found that that optimism was linked to improved lung function even after smoking was taken into account.

Myers is sceptical about whether there is a simple way that people can become optimistic in order to improve their health chances. ‘I certainly would not suggest that there is anything like “six easy lessons to change your outlook’ But if you can lower your anxiety levels, it tends to make you more optimistic. Conversely, people who are highly anxious tend to be Pessimistic,’ she says.

Questions 1–5

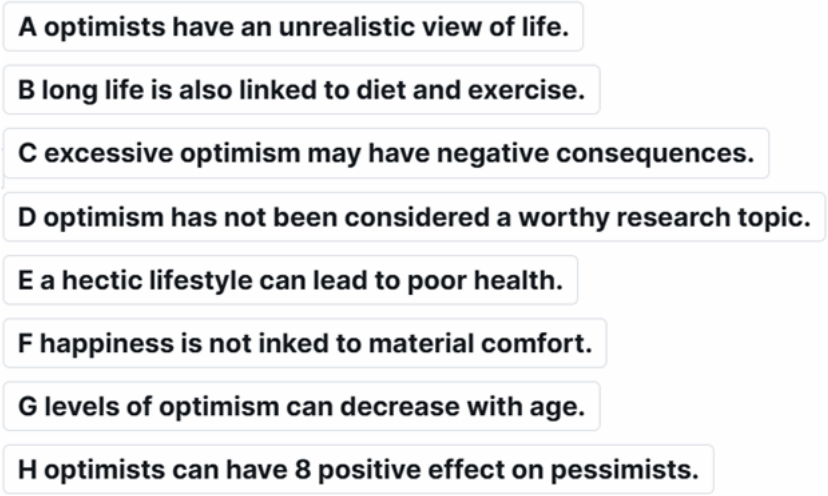
Complete the summary below.

Write **NO MORE THAN TWO WORDS** from the passage for each answer.

Studies at Yale University have shown that a positive altitude can lengthen someone’s lifespan by approximately (1)__________________________. Another US research tear claims to have found a physical reason why this happens. As a result of an eight-year study on (2)_________________________ male subjects of 3 certain age, they have noted differences in the (3)___________________________ among positive and negative thinkers. This discovery has led them to conclude that positive thinking makes the body’s entire (4)____________________________. Stronger, which, in turn, reduces ageing. Rosana Wright cites some early research on (5)________________________ in support of this view.

Questions 6–10

Complete each sentence with the correct ending, **A-H**, below.



A optimists have an unrealistic view of life.

B long life is also linked to diet and exercise.

C excessive optimism may have negative consequences.

D optimism has not been considered a worthy research topic.

E a hectic lifestyle can lead to poor health.

F happiness is not inked to material comfort.

G levels of optimism can decrease with age.

H optimists can have 8 positive effect on pessimists.

The writers reference to Sigmund Freud illustrates the point that (6)______________

According to Brice Pitt of Imperial College, London, (7)_____________

Researchers at the Henley Centre have shown that (8)______________

The 1995 Adweek Survey found that across the USA (9)_____________

The psychotherapist Lynn Myers suggests that (10)______________

Questions 11–13

Choose **YES** if the statement agrees with the claims of the writer, choose **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

11 It has been known for some time that there is a link between optimism and good health.

12 Optimists have better personal relationships with others than pessimists.

13 People who live to be over ninety-five are known to take the same amount of regular exercise.

New Technology in New Zealand's Health Service

A. At some time in their lives, nearly all New Zealanders will have to attend an after-hours clinic following an emergency or accident. On entering the consulting room, the patient is faced with a barrage of questions. The first ones relate to the current episode, and are followed by more general enquiries. Do you have any allergies? Are you on any medications? And so on. But imagine a different scenario. The patient walks into the consulting room and there on the healthcare professional's computer screen is his or her medical record in its entirety allergies, medications, test results and everything else. To some, it's amazing that this isn't happening already. After all, individuals can track their bank accounts, phone records and countless other transactions online, so why can't they track their health? Ian McCrae, Orion Health's CEO, says that it's understandable if health often falls behind other sectors in its adoption of information technology (IT). It might be. he argues, because of concerns about patient privacy, but also because health care is just so complicated.

B. The irony is, New Zealand started out being ahead of the game. The backbone of any health IT system is having a unique identifier for each patient, and New Zealand's national health index (NHI) number system was introduced in 1993, before most other countries in the world. Innovation then slowed for some years, but in 2011 the earthquake in Canterbury, which affected thousands of people, was a catalyst for health IT in that region of the country. Suddenly, many people couldn't be seen by their usual doctor and many health records were inaccessible. An existing plan for an electronic shared record was fast-tracked, and within six months a basic system, HealthOne, was up and running. By 2013, clinicians in the hospital emergency department were able to see all relevant medical information about patients. Dr. Nigel Millar, Chief Medical Officer for the Canterbury region, says within days doctors were telling him the information had already revolutionised the way they worked.

C. This idea, known as a 'patient portal', is now in operation in other parts of the country, including the capital Wellington. With a mobile app patients can remain connected to their patient portal on their mobile device, allowing for added flexibility. However, there's a lot of complacency in medicine, according to Dr. Richard Medlicott. He says that innovative IT systems have the potential to radically change health care delivery, because they will free doctors from routine administrative tasks and instead allow them to focus on diagnosis and patient care, which is where their skills are really needed. But he admits there is some way to go in the adoption of shared care records, and also in changing the mindset of some doctors who are resistant to change. A good example of technology in use comes from Australia, where the National Home Doctor Service has brought back a service that was becoming infrequent the home visit. The after hours service uses an app to arrange an on-call doctor who will visit patients at home to provide on-the-spot healthcare.

D. A key part of the health IT picture is maintaining a dialogue and exchange of ideas between healthcare professionals, according to Kate Reid. a director at Orion Health. Reid says this is critical, but it's not easy because there are so many different agencies that are sometimes in competition. Another issue, Reid says, is that there are many information systems that are being trialled today. However, these trials are not big enough to determine if they could ever work at a national level. One area where cooperation in health IT really could deliver benefits is in disease prevention and early intervention, says Reid. 'We've got innovations and technology that could be reaching at-risk people right now.' she argues, but the infrastructure is not in place to allow funding to be shifted from treatment to prevention. Scott Arrol, CEO of New Zealand Health IT, says that advances are comin, they're just not arriving as fast as everybody would like.

E. While IT is extremely important to a functioning health system. there are other areas where New Zealand technologies are improving health care. Dr. Hong Sheng Chiong, for example, has adapted a smartphone camera for medical use. The examination kit combines a phone adapter and app. allowing users to examine the eye with minimal training. Another innovation is the Clever MedKit, an intelligent first aid kit. It separates different items like band-aids and ice packs and orders replacements when necessary, making it particularly helpful in today's busy offices. In a separate field, the use of pre-made ceramic fittings which can be placed over a broken tooth in a single sitting reduces the cost of treatment. Dr. Adam Doudney came up with the idea before it was developed by researchers at the technology company Rhondium. Another idea is the Silhouette system, which offers a way to easily monitor wounds. It allows practitioners to detect small differences in wound size by collecting accurate images and data. Finally, the Auckland Bioengineering Institute is helping those wishing to keep fit or rehabilitate from injury. When placed on the body their special sensor moves with the wearer and measures the amount of movement, before the data is transmitted to the user's mobile or tablet. It'll be fascinating to see how these and other technologies transform medicine over the years to come.

Questions 14–18

Reading Passage 2 has five paragraphs, **A-E**.

Which paragraph contains the following information?

Choose the correct letter, **A-E**, in boxes 14-18.

NB *You may use any letter more than once.*

	A	**B**	**C**	**D**	**E**
14 reference to a medical practice that became less common but is now being used more frequently in one country					
15 reference to a health management scheme in New Zealand that was more advanced than those used in other nations					
16 the claim that some of the information systems being tested in the health sector are only on a small scale					

17 reference to the fact that most people in New Zealand will experience an urgent medical situation at some point					
18 mention of a dramatic event that led to improved use of health information technology in one part of New Zealand					

Questions 19–22

Look at the following statements (Questions 19-22) and the list of people below.

Match each statement with the correct person, **A-E**.

Choose the correct letter, **A-E**, in boxes 19-22.

NB *You may use any letter more than once.*

List of People

A. Ian McCrae

B. Nigel Millar

C. Richard Medlicott

D. Kate Reid

E. Scott Arrol

	A	B	C	D	E
19 Money should be invested in technology that attempts to stop people becoming sick, rather than caring for them once they are sick.					
20 There are good reasons why healthcare does not make more use of technology to manage patient information.					
21 Health professionals need to communicate and work together, even if they have different interests.					

22 New technologies will enable healthcare professionals to concentrate on the most important aspects of their work.					

Questions 23–26

Complete the summary below.

Write **ONE WORD ONLY** from the passage for each answer.

Other Health Technologies

Apart from IT, New Zealand scientists have made good progress with other types of medical technology. Dr Chiong has designed a camera so that doctors can look into a patient's (23)___________________ Clever MedKit provides everyday medical supplies for use in (24)_____________________ and ensures stocks are always up-to-date. Meanwhile, the cost of repairing a (25)_______________________ is likely to be reduced thanks to Dr Adam Doudney, whose idea was developed by researchers at Rhondium. Another breakthrough is that changes in the (26)_____________________ of wounds can now be recorded more accurately because of the new Silhouette system. Lastly, a new type of sensor developed by the Auckland Bioengineering Institute can assist fitness and recovery.

Game theory

Computer software that models human behaviour can make forecasts, outsmart rivals, and transform negotiations

A According to game theory, our chances of success in negotiations are based on the choices of others. Computer models have been developed to work out how events will unfold as people and organizations act in what they perceive to be their own best interests. Numerical values are placed on the goals, motivations, and influence of players, and likely options are considered. Game theory software then evaluates the ability of each of those players to influence others, and hence predicts the course of events.

B Although many individuals would feel uncomfortable having a computer make decisions for them, many organizations run such computer simulations for law firms, companies, and governments. But feeding software with accurate data on all the players involved is especially tricky for political matters. Reinier van Oosten of Decide, a Dutch firm that models political negotiations, notes that predictions may become unreliable when people unexpectedly give in to 'non-rational' emotions such as hatred, rather than pursuing what is apparently in their best interests. However, sorting out people's motivations is much easier when making money is the main object. Accordingly, modeling behavior using game theory is proving especially useful when applied to economics.

C Using game theory software to model auctions can be very lucrative. Consulting firms are entering the market to help clients design profitable auctions, or to win them less expensively. In 2006, in the run-up to an online auction of radio-spectrum licenses by America's Federal Communications Commission, Dr Paul Milgrom, a consultant and Stanford University professor in the United States, customized his game theory software to assist a consortium of bidders. He was apprehensive at first, but the result was a triumph. When the auction began, Milgrom's software tracked competitors' bids to estimate their budgets for the 1,132 licenses on offer. Crucially, the software estimated the secret values bidders placed on specific licenses and determined that certain big licenses were being overvalued. Milgrom's clients were then directed to obtain a collection of smaller, less expensive licenses instead. Two of his clients paid about a third less than their competitors for an equivalent amount of spectrum, saving almost $1.2 billion. Such a saving makes one wonder why everyone isn't using game theory software. And, if they were, how would that affect the game?

D PA Consulting, a British firm, designs models for software based on game theory to help its clients solve specific problems in areas from pharmaceuticals to the production of television shows. British government agencies have asked PA Consulting to build models to test scenarios that address how many of a type of business should be allowed to operate in a particular area. A simple example: if two competing ice-cream sellers share a long beach, they will set up stalls back-to-back in the middle and stay put, explains Dr Stephen Black, a modeler for PA. Unfortunately for potential customers at the far ends of the beach, each seller prevents the other from relocating – no other spot would be closer to more people. Introduce a third seller, however, and the stifling equilibrium is broken as relocations and pricing changes energize the market. By studying a chain of events such as this, software designers can assess the effect of change and see the patterns in possible outcomes that may occur. As a result, the use of modeling makes clients more inclined to look at future repercussions when making business decisions, Black says.

E Where is all this heading? Alongside the increasingly elaborate modeling software, there are also efforts to develop software that can assist in negotiation and mediation. Two decades ago, Dr Clara Ponsati, a Spanish academic, came up with a clever idea. She accepted that, as negotiators everywhere know, the first side to disclose the maximum amount that it is willing to pay loses considerable bargaining power. Without leverage, it can be pushed backward in the bargaining process by a clever opponent. But if neither side reveals the concessions it is prepared to make, negotiations can become very slow or collapse. However, difficult negotiations can often be pushed along by neutral mediators, especially if they are entrusted with the secret bottom lines of all parties. Ponsati's idea was that if a human mediator was not trusted, affordable, or available, a computer could do the job instead. Negotiating parties would update the software with the confidential information on their bargaining positions after each round of talks. Once positions on both sides were no longer mutually exclusive, the software would be used to split the difference and propose an agreement. Ponsati, now head of the Institute of Economic Analysis at the Autonomous University of Barcelona in Spain, says such "mediation machines" could be employed to push negotiations forward by unlocking information that would otherwise be withheld from an opponent.

F Could mediation which has been achieved using software based on game theory spread from auction bids and utility pricing to resolving political and military disputes? Today's game theory software is not yet sufficiently advanced to mediate between warring countries. But one day opponents on the brink of war might be tempted to use it to exchange information without having to engage in conflict. According to some game theorists, opponents could learn how a war would turn out, skip the fighting, and strike a deal. Over-optimistic, perhaps – but game theorists do have rather an impressive track record when it comes to predicting the future.

Questions 27–31

Choose the correct answer.

27 What does the writer suggest about game theory software in the first paragraph?

- Traditional negotiating practices should be used to supplement the software.
- Success of the software depends on the accuracy of the assigned values.
- This software anticipates the outcome of future events.
- Future business negotiations will be dominated by this software.

28 Reinier van Oosten says predicting what people will do works best if

- participants are honest about how they feel.
- there is a good understanding of the client's culture.
- people strongly dislike the other party.
- profit is the primary motivator.

29 After using game theory software in 2006, Dr Milgrom instructed his clients to

- buy big licenses.

- negotiate with the other parties directly.
- make one big offer at the end of the auction.
- purchase a mix of licenses.

30 The writer refers to Stephen Black's ice-cream seller example in order to

- show the impact new competitors have on business.
- highlight the importance of location on business success.
- demonstrate that businesses must follow a strategy.
- clarify how pricing affects sales.

31 Ponsati believes business negotiations are more likely to progress if

- a solution is proposed by one of the interested parties.
- mediators or computers take over the bargaining process.
- both parties follow the rules of negotiating.
- sufficient time is allowed for the bargaining process.

Questions 32–35

Choose **YES** if the statement agrees with the claims of the writer, choose **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

32 Game theory software may be unhelpful when dealing with political issues.

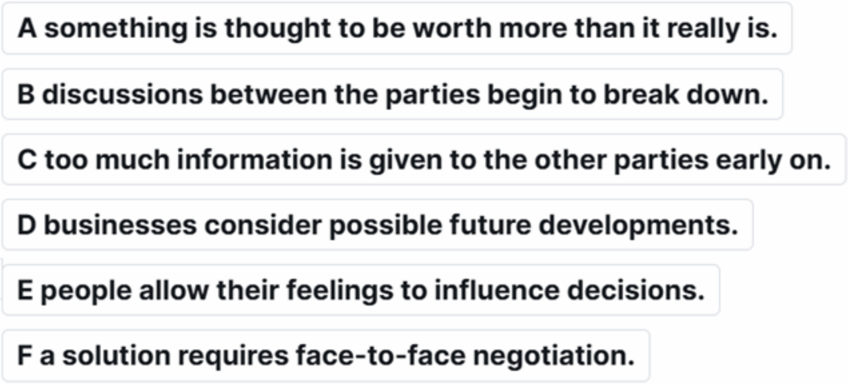
33 Dr Milgrom was confident about applying his software to an auction in 2006.

34 Dr Ponsati believes 'mediation machines' are an inappropriate method of negotiation in areas other than business.

35 Military organizations refuse to accept that software based on game theory could prevent wars.

Questions 36–40

Complete each sentence with the correct ending, **A-F**, below.



A something is thought to be worth more than it really is.

B discussions between the parties begin to break down.

C too much information is given to the other parties early on.

D businesses consider possible future developments.

E people allow their feelings to influence decisions.

F a solution requires face-to-face negotiation.

According to Reinier van Oosten, game theory software fails when (36)_________

Dr Milgrom's software is successful in detecting if (37)_________

Dr Black's game theory software is a helpful tool when (38)_________

According to Dr Ponsati, negotiators fall behind if (39)_________

Dr Ponsati's mediation machine is useful when (40)_________

TEST 7

William Gilbert and Magnetism

(1)____________________

The 16th and 17th centuries saw two great pioneers of modern science: Galileo and Gilbert. The impact of their findings is eminent. Gilbert was the first modern scientist, also the accredited father of the science of electricity and magnetism, an Englishman of learning and a physician at the court of Elizabeth. Prior to him, all that was known of electricity and magnetism was what the ancients knew, nothing more than that the lodestone possessed magnetic properties and that amber and jet, when rubbed, would attract bits of paper or other substances of small specific gravity. However, he is less well known than he deserves.

(2)____________________

Gilbert's birth pre-dated Galileo. Born in an eminent local family in Colchester County in the UK, on May 24, 1544, he went to grammar school, and then studied medicine at St John's College, Cambridge, graduating in 1573. Later he travelled in the continent and eventually settled down in London.

(3)____________________

He was a very successful and eminent doctor. All this culminated in his election to the president of the Royal Science Society. He was also appointed personal physician to the Queen (Elizabeth I), and later knighted by the Queen. He faithfully served her until her death. However, he didn't outlive the Queen for long and died on November 30, 1603, only a few months after his appointment as personal physician to King James.

(4)____________________

Gilbert was first interested in chemistry but later changed his focus due to the large portion of mysticism of alchemy involved (such as the transmutation of metal). He gradually developed his interest in physics after the great minds of the ancient, particularly about the knowledge the ancient Greeks had about lodestones, strange minerals with the power to attract iron. In the meantime, Britain became a major seafaring nation in 1588 when the Spanish Armada was defeat-ed, opening the way to British settlement of America. British ships depended on the magnetic compass, yet no one understood why it worked. Did the Pole Star attract it, as Columbus once speculated; or was there a magnetic mountain at the pole, as described in Odyssey, which ships would never approach, because the sail-ors thought its pull would yank out all their iron nails and fittings? For nearly 20 years, William Gilbert conducted ingenious experiments to understand magnet-ism. His works include On the Magnet, Magnetic Bodies, and the Great Magnet of the Earth.

(5)____________________

Gilbert's discovery was so important to modern physics. He investigated the nature of magnetism and electricity. He even coined the word "electric". Though the early beliefs of magnetism were also largely entangled with superstitions such as that rubbing garlic on lodestone can neutralise its magnetism, one example being that sailors even believed the smell of garlic would even interfere with the action of compass, which is why helmsmen were forbidden to eat it near a ship's compass. Gilbert also found that metals can be magnetised by rubbing mater-ials such as fur, plastic or the like on them. He named the ends of a magnet "north pole" and "south pole". The magnetic poles can attract or repel, depending on polarity. In addition, however, ordinary iron is always attracted to a magnet. Though he started to study the relationship between magnetism and electricity, sadly he didn't complete it. His research of static electricity using amber and jet only demonstrated that objects with electrical charges can work like magnets attracting small pieces of paper and stuff. It is a French guy named du Fay that discovered that there are actually two electrical charges, positive and negative.

(6)____________________

He also questioned the traditional astronomical beliefs. Though a Copernican, he didn't express in his quintessential beliefs whether the earth is at the centre of the universe or in orbit around the sun. However, he believed that stars are not equidistant from the earth but have their own earth-like planets orbiting around them. The earth itself is like a giant magnet, which is also why compasses always point north. They spin on an axis that is aligned with the earth's polarity. He even likened the polarity of the magnet to the polarity of the earth and built an entire magnetic philosophy on this analogy. In his explanation, magnetism is the soul of the earth. Thus a perfectly spherical lodestone, when aligned with the earth's poles, would wobble all by itself in 24 hours. Further, he also believed that the sun and other stars wobble just like the earth does around a crystal core, and speculated that the moon might also be a magnet caused to orbit by its magnetic attraction to the earth. This was perhaps the first proposal that a force might cause a heavenly orbit.

(7)____________________

His research method was revolutionary in that he used experiments rather than pure logic and reasoning like the ancient Greek philosophers did. It was a new attitude towards scientific investigation. Until then, scientific experiments were not in fashion. It was because of this scientific attitude, together with his contri-bution to our knowledge of magnetism, that a unit of magneto motive force, also known as magnetic potential, was named Gilbert in his honour. His approach of careful observation and experimentation rather than the authoritative opinion or deductive philosophy of others had laid the very foundation for modern science.

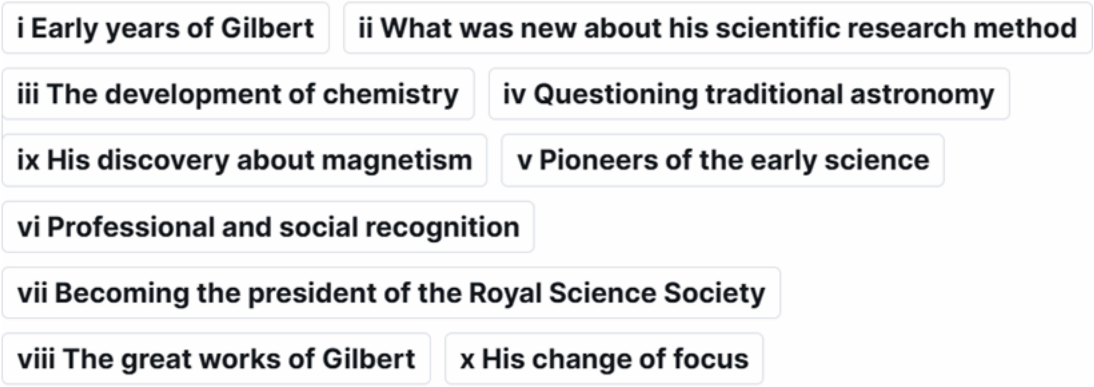
Questions 1–7

Reading Passage 1 has seven paragraphs.

Choose the correct heading for each paragraph from the list of heading below.

Choose the correct number, i-x, in boxes 1-7.

List of Headings



i Early years of Gilbert
ii What was new about his scientific research method
iii The development of chemistry
iv Questioning traditional astronomy
ix His discovery about magnetism
v Pioneers of the early science
vi Professional and social recognition
vii Becoming the president of the Royal Science Society
viii The great works of Gilbert
x His change of focus

Questions 8–10

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

8 He is less famous than he should be.

9 He was famous as a doctor before he was employed by the Queen.

10 He lost faith in the medical theories of his time.

Questions 11–13

Choose **THREE** correct answers.

11-13 Which THREE of the following are parts of Gilbert's discovery?

- Metal can be transformed into another.
- Garlic can remove magnetism.
- Metals can be magnetised.
- Stars are at different distances from the earth.
- The earth wobbles on its axis.
- There are two charges of electricity.

Multi-tasking and the brain

(14) ________________

Do you think you're a master of multi-tasking? Think again. Unless you are one of the three percent of super-taskers in the population, research shows that your brain is incapable of paying close attention to more than one complex task at a time. Researchers who study attention say that effective multi-tasking is beyond most of us. Psychiatrist Edward M Hallowell even describes multi-tasking as a 'mythical activity in which people believe they can perform two or more tasks simultaneously as effectively as they can perform one'.

(15) ________________

It’s true that you can check your email while eating your lunch, or listen to music while walking. But innate activities like walking, chewing, and breathing do not require you to pay attention, whereas activities such as reading, tapping out a text message or driving a car do require attention. Why is paying attention to two things at once difficult? 'The brain can perform simultaneous tasks, but attention has capacity limitations,' says Associate Professor Paul E Dux, a cognitive neuroscientist at the University of Queensland in Australia. When you do only one thing at a time, you’re better at that task than when you're doing multiple things concurrently.

Take the classic multi-tasking scenario of talking on a mobile phone while driving – an ill-advised activity that many people believe they have mastered. When David Strayer, Professor of Psychology in the University of Utah in the US, and his team observed 56,000 drivers as they approached an intersection. The majority of drivers who were talking on their phone failed to stop in accordance with traffic laws. And it did not matter if the driver was using a handheld or hands-free device. Even with both eyes on the road and both hands on the wheel, drivers' performance was impaired. Strayer’s research shows that performance deteriorates dramatically when attention is split between tasks: more mistakes are made and it takes longer to complete each activity.

(16) ________________

The prefrontal cortex is the brain region responsible for choosing what to pay attention to, and for coordinating inputs from other brain areas. By scanning the prefrontal cortex of people while they multi-tasked, scientists at the French Institute of Health and Medical Research in Paris (INSERM) found that when people focused on a single thing, the right and left sides of the prefrontal cortex work together. But when people attempt to perform two things at once, the sides work independently. Neuroscientist Etienne Koechlin says his study demonstrates that while the brain can switch back and forth between two tasks, we might be in great trouble when we try to juggle more than two tasks simply because we have only two frontal lobes.

(17) ________________

To the question of whether there is a difference between the sexes, Koechlin's imaging studies uncovered no differences in the ability switch between tasks in the prefrontal cortices of men or women. But other researchers studying real life scenarios such as finding lost keys, believe there might be truth to the claim that women are superior multi-taskers. Women have a much better strategy for finding the keys, whereas men tend to jump to it and be far less organised and thorough. 'It's as if they don't stop to reflect and plan for a moment,' says Professor Keith Laws from the University of Hertfordshire in England. But while the ability to develop strategies for coping with the numerous tasks in everyday life could give women an advantage, 'nobody can juggle two, never mind three, “complex” tasks at the same time.'

(18) _________________

However, David Strayer's research uncovered that some rare people possess extraordinary multi-tasking ability. These so-called 'super-taskers' exhibit different patterns of brain activity when multi-tasking compared to ordinary people: they show less activity in the prefrontal cortex during multi-tasking suggesting their brains are functioning with a high level of efficiency. Strayer thinks that pilots of high-performance aircraft, high-end chefs who can cook several meals at the same time to perfection, and elite doctors in hospital emergency rooms might all be more likely to be super-taskers. 'All other things being equal, we suspect that super-taskers will rise to a top position in any occupation that places a high demand on juggling numerous tasks that demand attention at the same time.'

(19) _________________

The ability to multi-task probably comes down to the DNA you inherit from your parents. To a large extent, says Strayer. 'You are either born with the neural structure that allows you to overcome the usual multi-tasking challenges, or you aren't. Super-taskers' brains are doing something we can’t do.' All in all, these findings may have very real consequences on our lives.

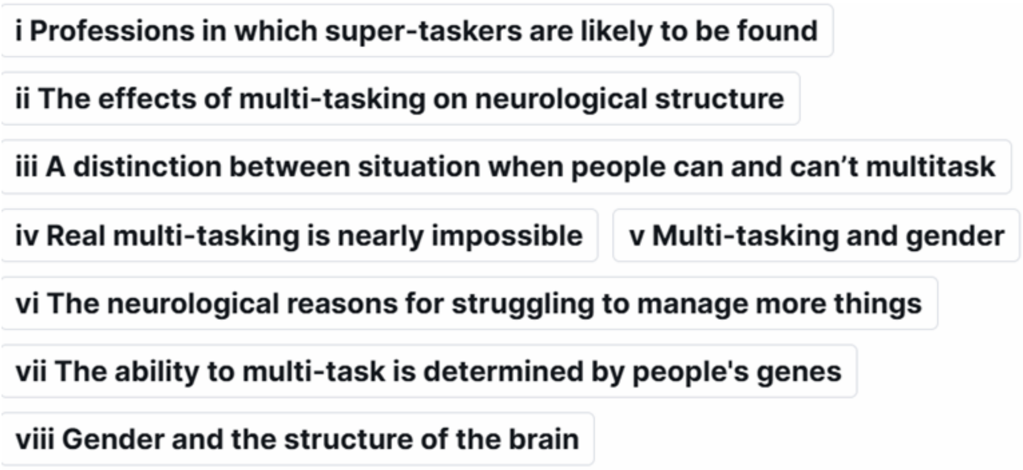
Questions 14–19

Reading Passage 2 has six sections.

Choose the correct heading for each section from the list of headings below.

Choose the correct number, i-viii, in boxes 14-19.

List of Headings



i Professions in which super-taskers are likely to be found

ii The effects of multi-tasking on neurological structure

iii A distinction between situation when people can and can’t multitask

iv Real multi-tasking is nearly impossible

v Multi-tasking and gender

vi The neurological reasons for struggling to manage more things

vii The ability to multi-task is determined by people's genes

viii Gender and the structure of the brain

Questions 20–23

Look at the following statements (Questions 20-23) and the list of researchers below.

Choose each statement with the correct researcher, **A-E**.

NB *You may use any letter more than once.*

List of Researchers

A Edward M Hallowell
B Paul E Dux
C David Strayer
D Etienne Koechlin
E Keith Laws

	A	B	C	D	E
20 The brain of a good multi-tasker works differently from other people's.					
21 The rate of error is considerably higher when people multi-task.					
22 People are mistaken in their assumption that they can multi-task.					
23 One gender does not seem to pause to consider before taking action.					

Questions 24–26

Complete the summary below. Write **ONE WORD ONLY** from the passage for each answer.

Super-taskers

Super-taskers are those of us who possess special multi-tasking ability. They can be found in all professions. People who are pilots, chefs and doctors are often super-taskers and super-taskers are most likely to achieve a (24)____________________ that is high on the career ladder. Super-taskers typically have to undertake many tasks simultaneously that need their (25)__________________. Genes play an important role in having this capability: these people have a special brain (26)__________________ which helps them do what we cannot.

The benefits of learning an instrument

Studies show that learning a musical instrument can bring about significant improvements in your brain

A Are music lessons the way to get smarter? That's what a lot of parents and experts believe: studying an instrument gives children an advantage in the development of their intellectual, perceptual, and cognitive skills. This may, however, turn out to be wishful thinking. Two highly convincing trials carried out recently have found no evidence to support this idea. The IQs of pre-school children who attended several weeks of music classes as part of these studies did not differ significantly from the IQs of those who had not.

B But that does not mean that the advantages of learning to play music are limited to expressing yourself, impressing friends, or just having fun. A growing number of studies show that learning an instrument in childhood can do something perhaps more valuable for the brain: it can provide benefits as we age, in the form of an added defense against memory loss cognitive decline, and impaired hearing. Not only that you may well get those benefits even if you haven't picked up your instrument in years, or decide to take up music for the first time in mid-life or beyond. According to neuropsychologist Brenda Hanna-Pladdy of Emory University in Atlanta, the time spent learning and practicing specific types of motor control and coordination – each finger on each hand doing something different, and for wind and brass instruments also using your mouth and breathing – contributes to the brain boost that shows up later in life.

C You can even map the impact of musical training of the brain itself. In one study, Harvard neurologist Gottfried Schlaug found that the brains of adult professional musicians had a larger volume of grey matter than the brains of non-musicians had. Schlaug and colleagues also found that after 15 months of musical training in early childhood, structural brain changes associated with motor and auditory improvements begin to appear. 'What's unique about playing an instrument is that it requires a wide array of brain regions and cognitive functions to work together simultaneously, in both right and left hemispheres of the brain,' says Alison Balbag of the University of Southern California. 'Playing music may be an efficient way to stimulate the brain,' she says, 'cutting across a broad swath of its regions and cognitive functions and with ripple effects through the decades.'

D More research is showing this might well be the case. In her first study on the subject, Hanna-Pladdy divided 70 healthy adults between the ages of 60 and 83 into three groups: musicians who had studied an instrument for at least ten years, those who had played between one and nine years, and a control group who had never learned an instrument. The group who had studied for at least ten years scored the highest when tested in such areas as nonverbal and visuo-spatial memory, naming objects, and taking in and adapting new information. Her follow-up study a year later confirmed those findings and further suggested that starting musical training before the age of nine and keeping at it for ten years or more may yield the greatest benefits. Interestingly, it was the group who had the lowest level of general education which showed the greatest gap in scores between those who had studied an instrument in childhood and those who had not. Hanna-Pladdy suspects that musical training could have made up for the lack of cognitive stimulation these people had academically.

E Neuroscientist Nina Kraus of Northwestern University in Chicago has found still more positive effects of early musical training. She measured the electrical activity in the auditory brainstems of adults, ages 55 to 76, as they responded to the synthesized speech syllable 'da'. Although none of the subjects had played a musical instrument in 40 years, those who had trained the longest – between four and fourteen years – responded the fastest. 'That's significant,' says Kraus, 'because hearing tends to decline as we age, including the ability to quickly and accurately discern consonants, a skill crucial to understanding and participating in conversation.' 'If your nervous system is not keeping up with the timing necessary for encoding consonants, you will lose out on the flow and meaning of the conversation, and that can potentially create to a downward spiral leading to a sense of social isolation,' says Kraus. 'In addition, the fact that musical training appears to enhance auditory working memory might help reinforce in later life the memory capacity that facilitates verbal interaction.'

F In another study at the University of South Florida, assistant professor of music education Jennifer Bugos studied the impact of elementary piano instruction on adults between the ages of 60 and 85. After six months, those who had received piano lessons showed more robust gains in memory, verbal fluency, the speed at which they processed information, planning ability, and other cognitive functions, compared with those who had not received the lessons. Bugos believes that playing an instrument has beneficial effects, regardless of how old the person is when he or she begins. 'Musical training contains all the components of a cognitive training program that sometimes are overlooked,' she says, 'And just as we work out our bodies, we should work out our minds.'

Questions 27–30

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

27 Many parents indicate that their children struggle to learn a musical instrument.

28 The findings of the recent research into pre-school children's IQs are unreliable.

29 The main reasons people take up an instrument are that they enjoy playing music and being creative.30 Evidence about the long-term advantages of learning an instrument is increasing.

Questions 31–35

Choose the correct answer.

31 The studies mentioned in the first paragraph

- confirm a link between musical training and intelligence.
- present misleading information about the value of learning an instrument.
- suggest that there are undiscovered benefits to studying music.
- cast doubt on a belief about the effects of taking music lessons.

32 According to the second paragraph, there may be many benefits to studying music,

- even for those who begin learning in adulthood.
- providing the person learns the correct techniques.
- especially if the person practises on a regular basis.
- particularly if the person plays a range of different instruments.

33 The phrase 'this might well be the case' in the fourth paragraph suggests that

- music lessons and long-term physical well-being may be connected.
- the ability to learn music may depend on neurological features.
- learning an instrument may have a lasting impact on brain function.
- older people's brains may be better suited to studying music than those of children.

34 Which aspect of playing an instrument was included in Hanna-Pladdy's follow-up study but not in her first study?

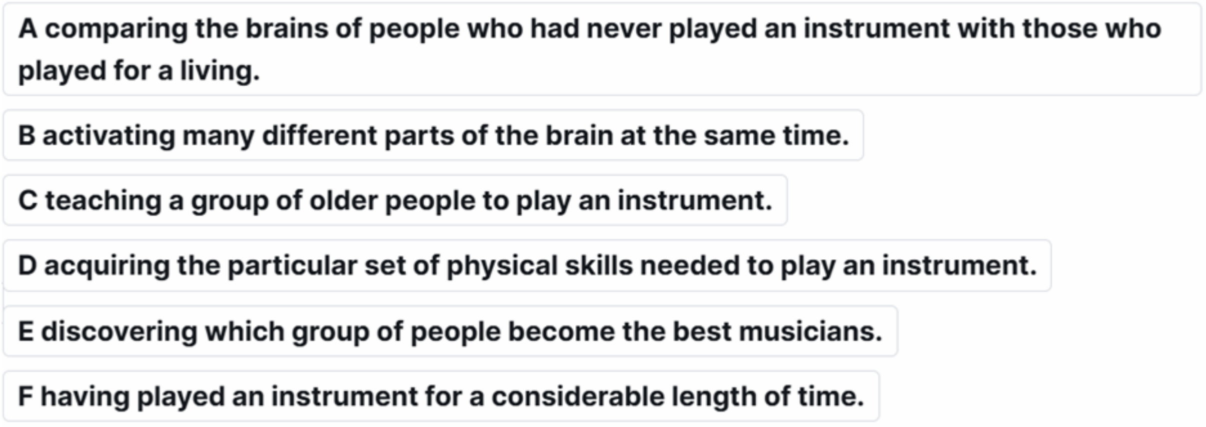
- the number of years that the person had played
- at which age the person began having lessons
- the length of time since the person last played
- how the person had practised as a child

35 What do Hanna-Pladdy's studies suggest about people's general education?

- Studying music compensates for an otherwise limited level of education.
- Leaming to play an instrument improves educational performance.
- Highly educated people are more likely to benefit from music training.
- Level of education makes no difference to a person's musical ability.

Questions 36–40

Complete each sentence with the correct ending, **A-F**, below.



A comparing the brains of people who had never played an instrument with those who played for a living.

B activating many different parts of the brain at the same time.

C teaching a group of older people to play an instrument.

D acquiring the particular set of physical skills needed to play an instrument.

E discovering which group of people become the best musicians.

F having played an instrument for a considerable length of time.

Brenda Hanna-Pladdy believes the cognitive benefits of music lessons are a result of (36)__________

The research undertaken by Gottfried Schlaug focused on (37)__________

According to Alison Balbag, playing an instrument is a unique experience because it involves (38)__________

Nina Kraus believes there is a link between better hearing in later life and the experience of (39)__________

Jennifer Bugos's study involved (40)__________

TEST 8

Jethro Tull (1674-1741)

Inventor of the Seed Drill

The English gentleman farmer who revolutionised the practice of agriculture

A Jethro Tull was a major pioneer in the modernisation of agriculture. He was born in 1674 in Berkshire, southern England, into a family of land-owning gentry. He studied first at Oxford University and then at the Inns of Court, London, in preparation for a legal or political career. However, ill health caused him to postpone these plans, and after qualifying as a barrister in 1699, he made a tour of Europe, in the hope that the milder climates of France and Italy would alleviate his breathing problems. In every country through which he passed, he made careful observations of the soil and agricultural production, and on his return to England, the young Tull married, then began farming with his father at Howberry Farm in Oxfordshire.

B Tull was determined to improve farming methods and increase crop yield on the family land, and pursued a number of agricultural experiments there. He particularly wanted to increase efficiency in the sowing of seeds. At that time seeds were still thrown by hand across the field in a haphazard manner, in a traditional method known as broadcasting. Tull soon realised this method of random distribution was inefficient, being wasteful of both seed and labour, so he instructed his staff to sow seeds at very precise, low densities. But by 1701, his frustration with their lack of co-operation prompted him to invent a machine to do the work for him.

C Earlier in his life, Tull had once dismantled a pipe-organ, and the application of the technology behind this musical instrument inspired him to devise a drill that would distribute precise amounts of seed into pre-cut channels. Basic seeding devices had been known for almost 2000 years, but Tull took the concept a stage further. In his device, as the main wheels of the drill turned, the cylinder rotated against a spring-held tongue. This allowed seed to pass evenly from the hopper above to a funnel below. From here, the seed was directed at regular intervals into three channels, or furrows, in the earth. These were dug to a specific depth by the blades at the front of the machine. Spikes at the back of the machine then turned the soil over to immediately cover the seeds. Tull's 'seed drill' would limit the wastage of seed, and as the seedlings grew in uniform rows, it would also make it easier to remove any unwanted weeds growing among the crop. Accordingly, each plant would have more space to grow, and although there would be fewer plants, the net yield would be greater.

D Initially the machine was only a limited success, and in 1711 Tull decided to travel around Europe again, both to improve his health and to study agricultural techniques there. Upon his return in 1714, he perfected both his system and machinery. Following practices he had observed in the vine-growing methods of southern Europe, he used an animal-drawn hoe to turn over and pulverise the earth between the rows. He wrongly believed that this practice would release enough nutrients in the soil to nourish the crop, and so eliminate the need for manure to be used to fertilise the soil. His experiments were apparently successful, as he did manage to grow wheat in the same field for 13 successive years without the use of manure. However, it is more likely that it was the turning over and pulverisation of the soil that cut down on the volume of weeds competing with the seed.

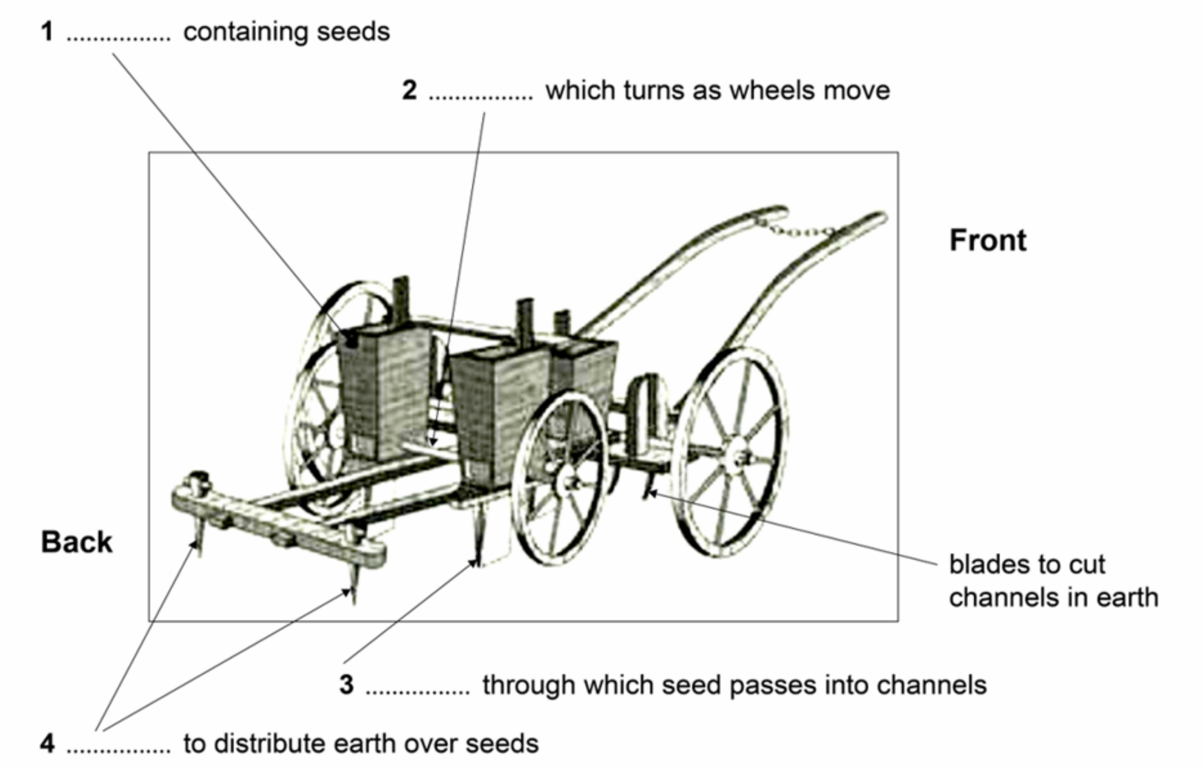
E Tull's complete system eventually proved to be a major influence in the agricultural revolution, and its impact can still be seen in today's methods. Most subsequent drilling and hoeing implements have been either copies of, or improvements upon his inventions, and his modifications to the basic model of the plough continue to be visible in modern versions. Tull also advocated the use of horses over the oxen, more traditionally used to pull farm machinery, and published a book in 1731 outlining this and other ideas to enhance agricultural efficiency. The book caused great controversy when it appeared, and resistance to his revolutionary theories persisted for many decades. Another century would pass before his eventual vindication. It was only following the editing of his writings in 1822, and the subsequent translations and acceptance in France, that Tull's ideas finally achieved recognition in his native land. Although in his lifetime Tull's methods and inventions were dismissed and ridiculed, they were gradually adopted by large landowners, and in time, came to form the basis of modern agriculture.

Questions 1–4

Label the diagram below.

Write **ONE WORD ONLY** from the passage for each answer.

Jethro Tull's seed drill


1 .... containing seeds
2 .... which turns as wheels move
Front
Back
blades to cut channels in earth
3 .... through which seed passes into channels
4 .... to distribute earth over seeds

(1)____________________________ (2)____________________________

(3)____________________________ (4)____________________________

Questions 5–8

Complete the sentences below.

Write **NO MORE THAN TWO WORDS** from the passage for each answer.

What name was given to the traditional technique of seed-sowing?
(5)____________________________

What type of agriculture gave Tull inspiration on his second tour of Europe?
(6)____________________________

What traditional addition to soil did Tull believe to be unnecessary?
(7)____________________________

What animals did Tull recommend farmers should use to pull their machinery?
(8)____________________________

Questions 9–13

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

9 Tull was employed in the legal profession before taking up farming.

10 The staff on Tull's farm were unwilling to follow his instructions.

11 Tull reduced the amount of weeds in his wheatfield.

12 Tull lived to see his ideas finally accepted.

13 Tull's original book, published in 1731, sold very few copies.

The internal body clock

Each of our cells has an internal 'clock' which dictates our daily rhythms. But why?

A From buffalo to bacteria, oaks to algae, all life follows the same relentless 24-hour cycle, which is driven by the rising and setting of the Sun. Or is it? Over 250 years ago, a French scientist performed a simple experiment that blew apart the idea that all life on Earth does the bidding of the Sun. Intrigued by the way some flowers open and close their leaves each day, Jean-Jacques de Mairan put a heliotrope in a darkened room and observed the effect. He was expecting the plant, robbed of sunlight, to cease its daily routine. To his astonishment, its leaves continued to open and close as if in response to some invisible timekeeper.

B But what – and where – is this internal timekeeper? And how does it achieve such astonishing regularity? These are the mysteries at the forefront of chronobiology, the study of the effect of time in living organisms. The search for answers is about more than just tying up some scientific loose ends. Internal 'clocks' clearly cause a lot of hardship. When an individual's 'clock' is knocked out of synchronization through having to work at night or go on long-haul flights, that person can be left utterly unable to think or act. Yet even when these 'clocks' work correctly, the natural rhythms of alertness they generate prove dangerous: traffic accident statistics show two deadly peaks, at 4 a.m. and again twelve hours later when people are at their least alert.

C During the 1970s, best-selling books began to emerge claiming such phenomena were manifestations of so-called biorhythms, a set of three cycles governing physical, emotional and intellectual traits. Said to start from the moment of birth and repeat every 23, 28 and 33 days respectively, they were supposed to result in 'critical days' when one or more cycles led to sub- optimal performance, with unfortunate consequences.

D Scientists have since dismissed biorhythms as pseudoscience, insisting the existence of the three cycles has no basis in fact. In 1998, Dr Terence Hines of Pace University, New York State published the most comprehensive study of the claims made for biorhythms, reviewing the results of over 130 investigations. He found that three-quarters of them failed to provide any support for biorhythms. Most of the remainder contained blunders ranging from faulty mathematics to basic errors in statistics, while the handful of positive studies were explicable as flukes.

E But there is no doubting the existence of 24-hour biological cycles – or, rather, ones roughly 24 hours long. Following de Mairan's pioneering work, other researchers found that when deprived of the cues provided by sunlight, organisms settle down to 'free-running' cycles that are close to, but rarely exactly, 24 hours. In the case of humans, the cycle is typically around 24.5 hours long. This is the so-called 'circadian' cycle (from the Latin meaning 'about a day'), the length of which is generated by the mysterious internal 'clock'.

F During the late 1960s, chronobiologists believed they had found the 'clock', in the form of the suprachiasmatic nucleus (SCN), a collection of nerves in a region of the brain known as the hypothalamus. Linked to photosensitive cells in the eye, the SCN senses daylight and triggers the release of hormones like melatonin, which keep body functions in synchronization with the time of day. For a few years the SCN was regarded as the ultimate pacemaker – at least in higher organisms such as ourselves. But in 1971, scientists at the California Institute of Technology working with fruit flies found evidence for something truly amazing. Fruit flies appeared to have genes affecting the daily rhythm of their behavior – suggesting that there are ‘clocks’ inside each of their cells. Further evidence for this emerged in 1995, when researchers at Massachusetts General Hospital isolated nerve cells from the SCN, and found they kept up a circadian cycle without help from daylight. Finally in 1997, scientists at Northwestern University in Illinois found a gene that regulates the daily rhythms of cellular activity in mammals.

G The details of how this gene, known as CLOCK, actually works are still being investigated, but they could culminate in better ways of coping with shift-work and jet-lag. Professor Takahashi, who led the research, says that now that we know that circadian clocks exist throughout our bodies, we will need new strategies and therapeutics to reset all of our cells. But how do all the biochemical ‘clocks’ inside their cells stay in synchronization and why did organisms bother to acquire a link with sunlight? So far, no-one knows, though there are several theories. For example, sunlight might be useful in keeping the myriad cellular ‘clocks’ in lockstep.

H In the search for answers, researchers are studying the behavior of a microbe called cyanobacterium. In 2005, a team at Nagoya University, Japan, showed that chemical reactions between three proteins produced by this bacterium ebbed and flowed on a 24-hour cycle. Cyanobacterium is the oldest form of life on Earth, so this suggests that cellular ‘clocks’ have existed for over three billion years. All subsequent organisms have followed suit, says Professor Johnson of Vanderbilt University, Tennessee. ‘Bacteria, fungi, plants and animals all appear to have evolved clock systems independently from each other.’ Quite why is still unknown. But one thing is clear: the daily routine of life is certainly not a modern invention.

Questions 14–18

Reading Passage 2 has eight paragraphs.

Which paragraph contains the following information?

	A	B	C	D	E	F	G	H
14 support for an earlier finding from experiments on insects								
15 criticism of the way some research data was analysed								
16 reference to a basic test on a plant								

17 a statement that the length of natural cycles varies slightly between living things								
18 reference to a theory that became popular with the public								

Questions 19–22

Complete the summary below.

Write **NO MORE THAN TWO WORDS** from the passage for each answer.

An overview of research into the existence of the internal ‘clock’

Towards the end of the 1960s, research into the SCN, which is located in the hypothalamus led chronobiologists to believe they had found the internal ‘clock’ at last. Their theory was based on the fact that certain hormones that regulate the timing of physical functions are controlled by the SCN. The SCN is able to perceive (19)________________________ as a result of connections to the eye.

Several years later, research involving (20)________________________ showed that the timing of their normal actions was regulated by certain (21)________________________ or ‘clocks’, in their cells. Thus the internal ‘clock’ is not an individual mechanism, as previously thought, but exists within each cell. Other scientists went on to conduct experiments in the dark that proved that a (22)________________________ was maintained by individual SCN cells.

Questions 23–24

Choose **TWO** correct answers.

23-24 Which TWO of the following problems are stated as being linked with the internal ‘clock’?

- a decrease in output in workplaces without windows to let in natural light
- a failure among workers on night-shifts to perform tasks
- an increase in casualties on the roads at specific times of day
- a decline in efficiency on certain days in a number of fixed cycles
- a rise in mood swings dependent on the appearance of the Sun

Questions 25–26

Choose **TWO** correct answers.

25-26 Which TWO of the following issues relating to internal 'clocks' remain to be solved, according to information in the passage?

- the precise length of the free-running daily cycle in different animals
- the reason for 'clocks being temporarily driven out of synchronisation
- the reason for living beings forming a connection with the Sun's rhythms
- the way in which all 'clocks' in a single organism are able to stay in step with one another
- the location of the 'clocks' across the whole range of living organisms

The origin of language

Theories on the origin and evolution of language have been a major area of my research for many years. By 1859, when British scientist Charles Darwin published The Origin of Species, there was already a great deal of interest in this subject. However, the debate became plagued by strange theories, so much so that in 1866 the influential Société de Linguistique de Paris banned all discussions about the origin of language. The ban lasted for more than a century, before a surge of research began during the 1990s. Linguists, psychologists, anthropologists, and archaeologists now frequently debate the origin of language and have published many articles and books on this topic. And yet, despite almost frenzied activity, limited progress has been made.

I believe there are four reasons for this. The first is an insufficient concern with the archaeological and fossil proof of the brains and behaviour of our human ancestors. Many theories to date rely on an assumed association between brain size and language abilities, without acknowledging the problem this creates: fossil evidence indicates that the **Neanderthals*** had larger brains than modern humans, Homo sapiens, but archaeological evidence indicates that the Neanderthals lacked a capacity for language. So something is seriously amiss with those theories.

That 'something' might relate to the second reason for limited progress: insufficient concern with the other major aural and vocal communication system of modern humans: music. Even though the Société de Linguistique de Paris had nothing to say about studying the origin of music, academics appear to have had a self-imposed ban, with limited discussion of this issue during the 19th and 20th centuries. However, there are notable exceptions that should be acknowledged. One is the aforementioned Charles Darwin who, in his 1871 book on human evolution, The Descent of Man, devoted several pages to the development of music. Another is the renowned ethnomusicologist John Blacking, whose 1973 book, How Musical is Man?, broached the idea that music is an inherent and universal human quality.

The origin of music deserves as much attention as that of language, as we cannot treat one without the other. Those writers who had evidently annoyed the Société de Linguistique de Paris were quite aware of this. For them, music and language were intimately linked; the French writer and philosopher Jean-Jacques Rousseau's On the Origin of Language (1781) was a reflection on both music and language. In contrast, Morten Christiansen and Simon Kirby's book, Language Evolution (2000), which they conceived as 'a definitive book on the subject,' failed to mention music in any of its 17 chapters. Those authors have an important lesson to learn from Rousseau and other writers of his time who addressed the origin of language.

Music is a universal feature of human society and plays a significant role in the lives of all individuals. Indeed, music is perhaps in even greater need of study than language: the latter has a self-evident function — the transmission of information — and can be readily accepted as a product of evolution, even if its specific evolutionary history remains unclear. But what is the point of music?

That question leads directly to a third reason for our lack of progress in understanding how language evolved, and indeed the human mind in general: an insufficient concern with emotion. If music is about anything, it is about expressing emotion. But while archaeologists have put significant effort into examining the intellectual capacities of our ancestors, their emotional lives have been sorely neglected. This has contributed to the neglect of music, which, in turn, has constrained our understanding of language.

There is one further reason why progress has been limited: those who have been most influential regarding the evolution of language have simply got it wrong, and misled everyone else. Linguist Derek Bickerton has made an important contribution towards our understanding of the origin of language by bringing his profound knowledge of linguistics to the discussions that have occurred. But Bickerton's idea that the precursor of modern language consisted of words strung together with limited, if any, grammar is, I believe, fundamentally mistaken. Bickerton refers to this precursor as 'proto-language' and suggests that it was similar to the type of 'language' spoken by young children today, and mastered by apes through the use of computer keyboards. This idea has dominated the field of language origins for the last two decades, and is one that I once found persuasive. But I now understand that it is not only flawed but has severely limited the progress that should have been made.

My book therefore provides an alternative view, one that draws on the ideas of a linguist who has, I believe, identified the true nature of proto-language. Her name is Alison Wray. She argues that proto-language was 'holistic' rather than 'compositional' in character. By this she means that the precursor to language was a communication system composed of 'messages' rather than words; each message was uniquely associated with an arbitrary meaning, as are the utterances of language today. But in Wray's proto-language, they were not composed out of smaller units of meaning (i.e. words) which could be combined together using a rule system (i.e. grammar) to make more complex messages with emergent meanings. For Wray, proto-language was 'semantically complex and agrammatical'. I believe this insight enables us to understand the origin of music as well as language, and to relate both to the emotional lives of our human ancestors.

Neanderthals*: *an extinct race of humans who lived in Europe 230,000 to 35,000 years ago*

Questions 27–31

Choose the correct answer.

27 In the first paragraph, what does the writer suggest about the origin of language?

- Too many branches of science have been involved in its study.
- The Société de Linguistique de Paris instigated research in this area.
- The lack of progress is surprising given the amount of work being done.
- Most progress in the study of language was made between 1859 and 1866.

28 What is ‘the problem’ referred to in the second paragraph?

- Some current theories are based on conflicting evidence.
- There is insufficient fossil evidence to reach a conclusion.
- Fossil evidence suggests that Homo sapiens had larger brains than Neanderthals.
- Archaeological evidence shows that Neanderthals were able to talk.

29 What does the writer suggest about Jean-Jacques Rousseau’s work in 1781?

- Modern theorists should pay more attention to his approach.
- His ideas supported those of the Société de Linguistique de Paris.
- His ideas were mirrored in a later book called Language Evolution.
- His ideas are too outdated to be of any relevance today.

30 What is the writer’s current view of Derek Bickerton’s ideas?

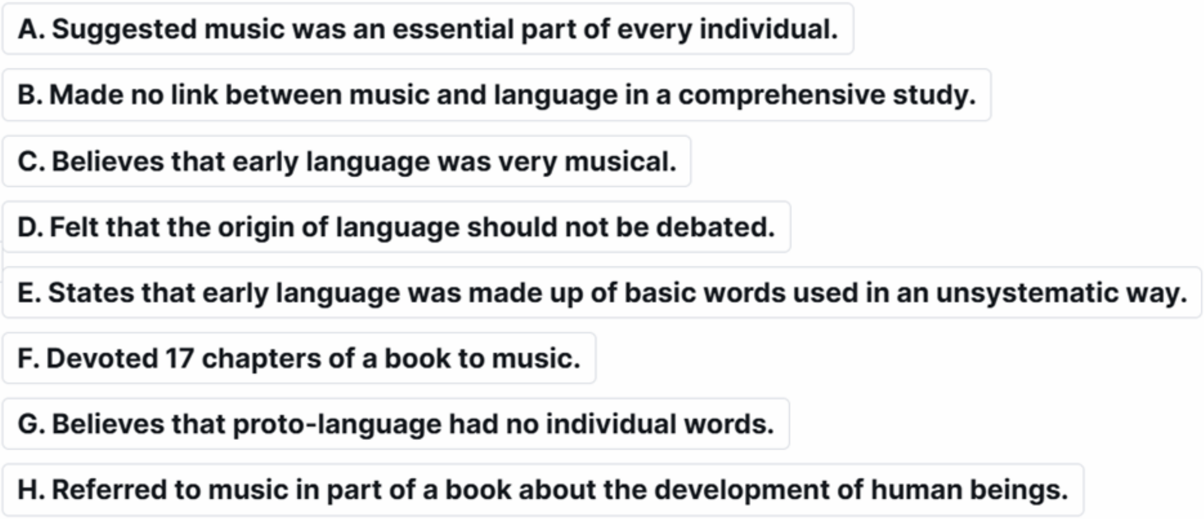
- They have had little impact on the study of language.
- They have helped the study of linguistics to progress.
- They are not accepted by the majority of linguists.
- The assumption behind them is wrong.

31 In the final paragraph, the writer concludes that Alison Wray’s ideas will help establish a link between:

- grammar and meaning.
- messages and proto-language.
- language, music and emotions.
- proto-language and modern semantics.

Questions 32–37

Complete each sentence with the correct ending, A-H, below.



A. Suggested music was an essential part of every individual.

B. Made no link between music and language in a comprehensive study.

C. Believes that early language was very musical.

D. Felt that the origin of language should not be debated.

E. States that early language was made up of basic words used in an unsystematic way.

F. Devoted 17 chapters of a book to music.

G. Believes that proto-language had no individual words.

H. Referred to music in part of a book about the development of human beings.

The Société de Linguistique de Paris (32)_________

Charles Darwin (33)_________

John Blacking (34)_________

Christiansen and Kirby (35)_________

Derek Bickerton (36)_________

Alison Wray (37)_________

Questions 38–40

Choose **THREE** correct answers.

38-40 According to the writer, which THREE of the following areas have not been studied enough in order to understand the origin of language?

- Evidence from prehistoric times
- Intelligence
- Individual sounds
- Music
- Emotions
- Human intellect
- Children’s language

TEST 9

Ahead of its time

A chance discovery in New Zealand has challenged the country's recorded history

One October afternoon, a young New Zealander, Sam Tobin, called his dogs and went for a walk down to the nearby Ruamahanga River. Having been very high for days, the river had at last fallen, and Tobin was eager to see what changes the floods had brought. The family farm borders the river and a four-metre-high flood bank testifies to its natural tendency to flood.

Tobin stepped out onto a broad shoulder of river sand, where he noticed what he initially took to be a whitish rock, lit by the sun. Then, getting closer, he realised it was a bone. Such a thing was not uncommon in these parts - he had often come across bone fragments, or even whole skeletons, of cows and sheep. But as he scraped aside the stones he realised it was a human bone, something quite new in his experience. As he picked it up, he saw it was a skull, discoloured with age.

Tobin replaced the skull and hurried home to tell his mother what the river had delivered to their doorstep. It would prove to be a spectacular find, setting in motion an investigation by some of the country's most respected specialists, and ultimately challenging our most firmly held assertions about the human settlement of New Zealand.

The police were immediately called, but despite a thorough search could find nothing that might shed light on the identity of the Ruamahanga skull, or the circumstances of its sudden appearance. The skull was then taken north to be examined by forensic pathologist Dr Ferris, at Auckland Hospital. Despite being hampered by its damaged and incomplete condition - the jawbone and lower left portion of the cranium were missing - Dr Ferris determined that the skull was that of a female. He then consulted with a colleague, Dr Koelmeyer, who believed that the deterioration of the bone placed the time of death 'before living memory' and, most significantly as it would turn out, the skull appeared to be European in origin.

Wellington-based forensic anthropologist Dr Watt also examined the skull, and suggested it belonged to a 40-45 year-old. He believed that it could be the remains of an old farm burial, but was not certain, and proposed the use of radiocarbon dating to make sure it wasn't a recent death. As a result, the Institute of Geological and Nuclear Sciences (GNS) in Lower Hutt was contacted, and provided with a sample of bone that had originated in the top of the skull. In a little over three weeks the seemingly astonishing results from the GNS laboratory came back. Cutting through the bewildering complexity of the scientific analysis was a single line reading: conventional radiocarbon age approximately 296 years. This was staggering, for the skull was about 200 years older than Dr Koelmeyer had believed.

Of course, a skull of this age wasn't particularly unusual in New Zealand. The Maori people have been living in the country for at least 800 years and scientists frequently come across human remains of considerable age. The fascinating question, however, was how a skull of this race, let alone this gender, had reached these remote islands in the South Pacific at such a time, long before the arrival of the explorer Captain Cook in 1769, and perhaps even before the very first European landfall - the fleeting visit of the Dutch explorer Tasman in 1642 - neither of whom had women among their crews.

The first known European women in the Pacific came with a doomed colonising venture which sailed from Peru in 1595 under the command of Spanish captain Mendana. However, it is unlikely the Ruamahanga skull originated from this expedition because no evidence of Mendana's ships has ever been found in New Zealand, while a team of archaeologists working in the Solomon Islands in 1970 did discover the remains of European vessels dating from the 16th century.

Two centuries were to pass before the first recorded European females arrived in New Zealand, both having escaped from prison in Australia. Kathleen Hagerty and Charlotte Edgar are known to have reached the country in 1806. How then do we account for the Ruamahanga skull, which appears to be about 100 years older than that? It is impossible to say with certainty, but the most likely explanation is that a Spanish or Portuguese trading-hip was washed onto these wild shores as a result of a shipwreck and a woman got ashore. Implausible, perhaps, but the Ruamahanga skull, today resting in the Wellington Museum, could be the kind of concrete evidence that demands such a drastic re-evaluation of history.

Questions 1–4

Choose **TRUE** if the statement agrees with the information given in the text,

choose **FALSE** if the statement contradicts the information,

or choose **NOT GIVEN** if there is no information on this.

1 The Ruamahanga River often floods.

2 When Tobin first found the object in the river, he mistook it for something else.

3 Tobin could not decide what part of the body the bone came from.

4 Tobin's mother was surprised that the skull caused debate among specialists.

Questions 5–9

Complete the flow-chart below.

Write **NO MORE THAN TWO WORDS AND/OR A NUMBER** from the passage for each answer.

The events after the river flooded

Tobin found a human skull.

⬇

The (5) _______________ were initially involved in trying to explain the presence of the skull.

⬇

Dr Ferris believed the skull belonged to a female.

⬇

Dr Koelmeyer suggested it was a (6) __________________ skull.

⬇

Dr Watt recommended (7) __________________ to establish the skull's age.

⬇

A bone (8) __________________ was sent to the GNS.

⬇

The age of the skull was about (9) __________________ years.

Questions 10–13

Complete the notes below.

Write **ONE WORD ONLY** from the passage for each answer.

Problem of the skull's origins
Old bones common in NZ - Maori living there for 800 years - Ruamahanga skull surprising because of its
- Age
- (10)__________________
- Gender

Mendana expedition
Possible source of skull
But probably did not visit NZ
Evidence of this expedition found elsewhere by (11)__________________

New Zealand
First European explorer arrived in 1642
Hagerty and Edgar arrived in 1806 from (12)__________________ where they had been imprisoned

Possible solution
Ruamahanga skull may have reached NZ in 17th century after a (13)__________________

REMOVING UNWANTED NOISE

(14)__________________

A noisy restaurant, a busy road, or a windy day are all situations that can be intensely frustrating for the hearing impaired when trying to understand what other people are saying. Some 10 million people in the UK suffer from hearing difficulties and, helpful as hearing aids are, those who wear them often complain that background noise continues to interfere with their understanding. But what if hearing aid wearers could choose to filter out all the troublesome sounds and focus just on the voices they want to hear?

Engineer Dr Richard Turner believes that this is fast becoming a possibility. He is developing a system that identifies the distracting noise and ‘rubs it out’. ‘The poor performance in noise of current hearing devices is a major reason why six million people in the UK who would benefit from hearing aids do not use them,’ he said. Moreover, as the population ages, a greater number of people will be hindered by the inability to hear clearly. In addition, hearing-impaired patients who have been fitted with cochlear implants – devices implanted to help those whose auditory hair cells have died – suffer from similar limitations.

(15)__________________

The solution lies in the statistics of sound, as Turner explained: ‘Many interfering noises are immediately recognisable. Raindrops patter on a surface, a fire crackles, talkers babble at a party and the wind howls. But what makes these different noises sound the way they do? No two rain sounds are identical because the precise arrangement of falling water droplets is never repeated. Nonetheless, there must be statistical similarities in the sounds of these raindrops compared with, say, the crackle of a fire.’ He believes that for this reason, the brain may be able to group similar types of sounds together based on their specific characteristics.

Turner and his colleagues have analysed this process mathematically and then developed algorithms that mimic what the brain is doing. The mathematical system that they have developed is capable of being ‘trained’ – a process that uses new methods from the field of machine learning – so that it can recognise new sounds. ‘Rather surprisingly, it seems that a relatively small set of statistics is sufficient to describe a large number of sounds’ he says. Crucially, the system that Turner and his team have come up with is capable of telling the difference between speech and other types of sound.

(16)__________________

‘What we can now do is to erase background noise and pass these cleaned-up sounds to a listener to improve their perception in difficult surroundings,’ said Turner. The idea is that future devices will have several different modes in which they can operate. These might include a mode for travelling in a car or on a train, a mode for places like a noisy party or a busy restaurant, a mode that can be used outdoors in windy weather, and so on. The device might intelligently select an appropriate mode based on the characteristics of the incoming sound.

(17)__________________

‘In a sense we are developing the technology to underpin intelligent hearing devices,’ said Turner. An additional possibility would be for users to override the selection made by the device and select a processing mode based upon what sorts of noise they wish to erase. They could even guide the processing on their device using an interface on a mobile phone through wireless communication. Turner anticipates that his team will need two more years of simulating the effect of modifications that clean up sound before they start to work with device specialists. ‘If these preliminary tests go well, then we’ll be looking to work with hearing device companies to try to adapt their processing in order to incorporate these machine learning techniques.’

(18)____________________

Tinnitus sufferers, who are plagued by a constant ringing in their ears, could also benefit from the technology. At present, people with tinnitus sometimes use environmental sound generators as a distraction from the ringing in their ears. But such generators offer only a limited selection of sounds – a gently flowing stream, waves lapping on the seashore, or leaves rustling. With the new technology, individual patients could select the best sound to distract them from their tinnitus.

(19)____________________

The technology not only holds promise for helping the hearing impaired, but it also has the potential to improve phone calls – anyone who has ever tried to hold a conversation with someone phoning from a crowded room will recognise the possible benefits of such a facility. Systems that can deal with unwanted audio content would also be welcomed by the increasing numbers of people using video-sharing websites. For example, a video containing a conversation that takes place by a busy roadside on a windy day could be made more intelligible by isolating the speech from the noises – users could even be offered the chance to de-noise their video during the upload process.

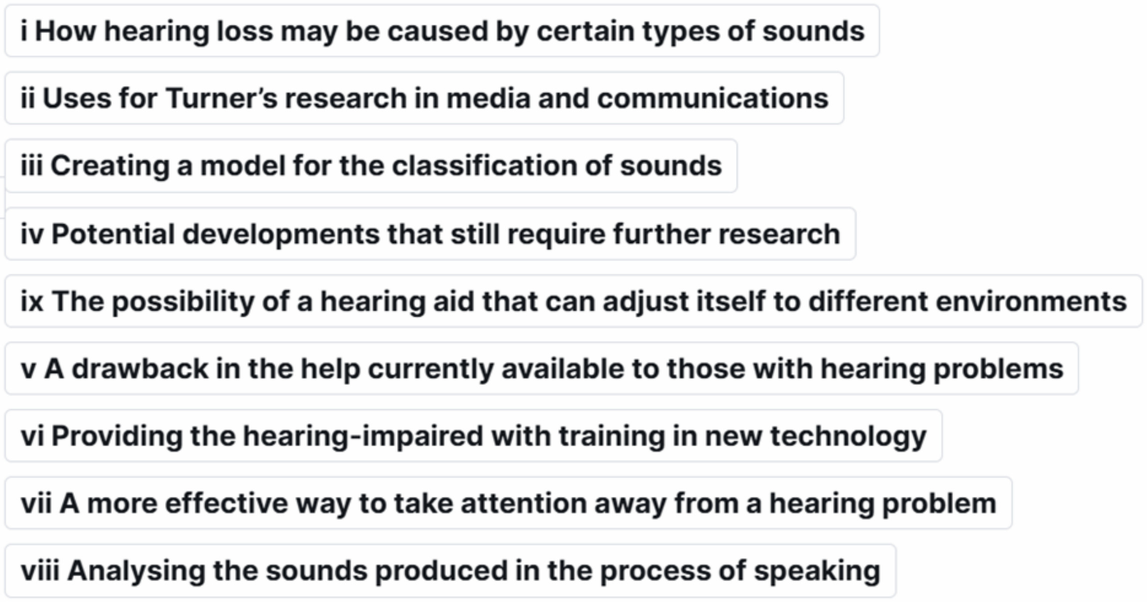
Questions 14–19

The text has six sections.

Choose the correct heading for each section from the list of headings below.

Choose the correct number, **i – ix**, in boxes **14 – 19** below.

List of Headings



i How hearing loss may be caused by certain types of sounds

ii Uses for Turner's research in media and communications

iii Creating a model for the classification of sounds

iv Potential developments that still require further research

ix The possibility of a hearing aid that can adjust itself to different environments

v A drawback in the help currently available to those with hearing problems

vi Providing the hearing-impaired with training in new technology

vii A more effective way to take attention away from a hearing problem

viii Analysing the sounds produced in the process of speaking

Questions 20–23

Complete the summary below.

Write **NO MORE THAN TWO WORDS** from the passage for each answer.

Improving the performance of hearing aids

At present, many people find their hearing aids do not work well when there is background noise. This also applies to people without hearing aids who have had implants fitted to help with hearing loss. Dr Richard Turner is looking for a solution to this problem. Although sounds are never (20)__________________________, he believes they do share some similarities. He and his colleagues have worked on a mathematical system using (21)__________________________ which replicate how we hear sounds. To allow this system to be 'trained', they have applied procedures used in machine learning and found that many different sounds can be described using a limited number of (22)__________________________. They have now developed a system that can distinguish (23)__________________________ from other sounds.

Questions 24–26

Choose the correct answer.

24 Turner's team are now planning a new development involving a device which could

- allow sound to be heard at a greater distance.
- adapt itself to different kinds of background noise.
- allow a user to remove all types of sound completely.
- adapt itself to disorders involving other senses.

25 In the 5th section, a stream, waves and leaves are examples of the sounds that tinnitus sufferers

- can currently use to help their condition.
- might choose to use if they were available.
- hear in their ears as a result of their condition.
- find to be the most natural solutions to their problem.

26 The writer refers to ‘a busy roadside on a windy day’ in the 6th section to illustrate that

- unwanted noise could be erased from video recordings.
- some environments are difficult for the hearing-impaired.
- when noises are combined in a video they are difficult to erase.
- people must cooperate in order to learn how to apply the technology

An enterprise education programme in Hong Kong

The Teen Entrepreneurs Competition (TEC) is an enterprise education programme developed by the Business Studies Division at the Hong Kong Institute of Education (HKIED) - the major training body for school teachers in Hong Kong. It has the following key objectives: to enable secondary school business students to integrate their conceptual learning with real business practices; to promote a collaborative approach to enterprise education; and to build up formal links between HKIEd, schools and entrepreneurs.

Among the various enterprise programmes in Hong Kong, TEC is unique as it is principally organised by pre-service teachers on their B.Ed course. At the beginning of the academic year, these pre-service teachers form an executive committee. They are advised by tutors in the Business Studies Division and some of them are selected to act as TEC instructors. These instructors attend a series of training sessions that cover the concepts of entrepreneurship and practical skills for business start-ups. They are then sent to the schools to co-work with teachers and meet the competition teams.

Over a three-month period, the teams are required to brainstorm an innovative business start-up that is suitable for the Chinese New Year. They then draft a business proposal, turn this into a real business by sourcing or creating their products, and set up a market stall at the HKIEd campus. The teams' business ideas and sales performance are assessed by an adjudicating panel that is made up of entrepreneurs, school principals, teachers, students and customers.

TEC has run annually for three years and has received favourable responses from both the education and local communities. In a recent evaluation survey, most participants ranked themselves in the satisfactory performance category and considered they had gained practical skills to run a small business. A typical response was: 'I understand enterprise better and have developed a good team spint. Moreover, positive views were obtained from some participants despite the fact that they had not had a good experience. For example, one participant reflected: 'I initially received a lot of criticism and even thought about giving up. However, I eventually learned to work in a systematic way."

The positive evaluation outcomes came not only from participants but from other stakeholders as well. The adjudicators commented that most of the business plans demonstrated an adequate understanding and application of entrepreneurship in the context of seasonal sales. In addition, the school teachers stated that TEC was a good platform in that it enabled their students to engage in business. They felt the zero drop-out rate strongly supported their views on the promising future of TEC.

The positive post-activity evaluations were indications of the programme's success, but an assessment of how well TEC met its objectives will clarify how sustainable it is as an enterprise education programme. One objective was to provide participant with the opportunity to integrate conceptual learning with real business situations. The research studies that were carried out indicated that the school students taking part in TEC were able to apply entrepreneurial knowledge gained in their studies to the authentic business situations created by the programme. In fact, participants not only succeeded in doing this, but also increased their overall understanding of business enterprise.

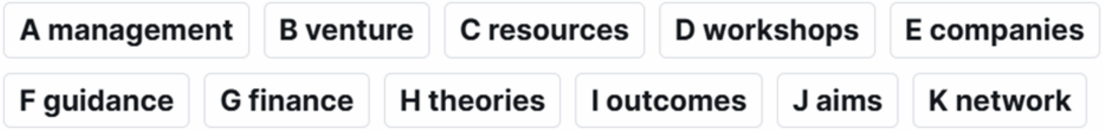
However, the financial and manpower support required by this kind of practical experience is beyond the resources of many schools. In fact, most teachers have little choice but to adopt a limited range of teaching methods, mostly based around traditional ones. Moreover, the dominant examination-orientated culture leads teachers to concentrate on written tests rather than explore practical experiences. TEC, however, is able to empower participants to be active learning agents, and provides a feasible means of filling the gap in educational provision.

The research studies also demonstrated that the objective of promoting a collaborative approach to enterprise education was met. From the very start of the programme considerable emphasis was placed on collaboration and teamwork. The participants had to cope in a learning environment which was full of ever-changing challenges, and this meant they had to find ways to deal with events as they occurred. This involved participants taking responsibility for their assigned role within the team and working closely with other team members. Moreover, at certain points, participants had to collaborate with other TEC stakeholders such as entrepreneurs and members of the local community.

The third aim was to develop a network between business and the business education field. Local entrepreneurs acted as sponsors and had an important role in ensuring the programme was financially viable. The network broadly consisted of three tiers. The first tier was made up of key players, including the participants, the teachers, the instructors and the executive committee. There was close collaboration amongst these groups: members of the committee communicated regularly with instructors to disseminate information to participants, and the school teachers and instructors met often to provide suitable guidance to participants. The second tier was an organisational level that mainly consisted of the participating schools and the HKIEd. The contribution of the teacher training institute was to provide logistical support for implementing the programme, including the provision of a venue and a credible point of contact between the schools and the committee. Finally, the third tier consisted of the entrepreneurs who served as judges or sponsors, community groups, the local press and the customers themselves. The positive responses of all these stakeholders and their continuing support is a vote of confidence for the sustainability of TEC in Hong Kong.

Questions 27–32

Complete the summary using the list of words, **A-K**, below.



A management **B venture** **C resources** **D workshops** **E companies**

F guidance **G finance** **H theories** **I outcomes** **J aims** **K network**

The Teen Entrepreneurs Competition - an outline

The Teen Entrepreneurs Competition (TEC) is an enterprise education initiative developed by the Hong Kong Institute of Education (HKIEd). The executive committee that organises the event is made up of pre-service teachers who receive (27)_________ from HKIEd staff.

The (28)_________ of the programme include giving secondary school students the opportunity to get involved in authentic business tasks and developing a (29)_________ consisting of the institute local business people and schools The teams that take part receive practical support from a group of instructors Before meeting the teams. the instructors go to (30)_________ where they develop practical skills and are taught a range of entrepreneunal (31)_________.
The competition requires teams to come up with a new business (32)_________ for the Chinese New Year. The teams also write business plans and purchase or make their products. The judges who include business people and education professionals consider their business performance and sales.

Questions 33–36

Choose **YES** if the statement agrees with the claims of the writer, choose **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

33 The questionnaire results indicated that relatively few participants were satisfied with their performance in TEC.

34 One participant was initially tempted to withdraw from the competition.

35 School teachers believed that some of their students were better suited to taking part in the competition than others.

36 School teachers thought that participants sustained interest in the programme confirmed their positive opinion of it.

Questions 37–40

Choose the correct answer.

37 In the sixth paragraph what point does the writer make about the TEC programme?

- The programme enabled participants to put theory into practice.
- There is little agreement on how sustainable the programme is.
- The participants evaluations of the programme were inconsistent.
- The programme showed how little participants knew about business.

38 What does the writer say about the objective of promoting a collaborative approach?

- Different participants adopted different strategies.
- The results of the research studies were inconclusive.
- The nature of the situations ensured that participants co-operated.
- Some participants were unable to develop the relevant skills.

39 What does the writer say about TEC's connections with the business world?

- Entrepreneurs offered valuable professional advice.
- There were a few communication problems with the entrepreneurs.
- Some entrepreneurs were unwilling to provide a suitable venue.
- Entrepreneurs helped to make the programme workable in terms of costs.

40 According to the final paragraph, the Hong Kong Institute of Education

- has voted to continue offering the programme
- was central in securing support from community groups
- has improved its reputation as a result of the programme
- was a useful link between the other contributors

TEST 10

The Whale Goes to Court

A remarkable legal drama in the U.S.A.

In 1818 a whale became the subject of a controversial court case in New York City. The case involved an old law requiring those who sold fish oil to pay a fee in order to have their barrels inspected by city officials, and certified. However, an oil merchant named Samuel Judd refused to pay the inspection fee on three barrels of oil, claiming that no inspection was necessary because it was whale oil, and whales were not fish. The state disagreed, and so a date was set for a court to decide not a point of law, but the answer to a more fundamental question: is a whale a fish?

As simple as that question may appear today, the answer was far from obvious in the early nineteenth century. Indeed, the public debate in New York sparked off by the trial was sensational. At stake was nothing less than what most regarded as the order of nature. According to the commonly accepted scheme of things, if an animal was not a beast or a bird, it was a fish, regardless of whether it breathed air or suckled its young. For as long as anyone could remember, all non-human creatures had been organised according to the categories of birds, beasts and fish. For the average person the answer seemed perfectly obvious: whales swam in the sea and therefore they were fish.

Against this traditional framework stood the new Linnaean system of classification, which sought to introduce more scientific values into the classification of living things. Barely half a century old in 1818, the Linnaean system controversially classified whales as mammals because they shared two mammalian characteristics: they were warm-blooded and breathed air.

So the trial began in December 1818. Judd's defence lawyers chose as their star witness one of New York's most prominent figures, the congressman Samuel Mitchill. Referred to as a 'living encyclopaedia' and a 'walking library', Mitchill was a renowned natural history lecturer at the College of Physicians and Surgeons who liked to dare his students to test his knowledge of the natural world. 'Show me the fin, and I will name the fish,' he boasted. Scientifically, it was an open-and-shut case, and Judd's defence lawyers believed they only had to do one simple thing to win the trial: insist that it be decided by biology alone. Mitchill seemed fully qualified for this role.

But this is where the case becomes interesting, and is the reason why the trial of the whale is not some dusty nineteenth-century obscurity. For rather than debate Mitchill on his area of expertise, lawyers for the New York City fish-oil inspectors chose a different tack. Lead counsel William Sampson turned the trial into a contest between scientific learning and common sense, by asking plain-spoken whalers to make their case before the jury.

The crux of Sampson's case was the trial's implication with regard to humans, should Judd be found not guilty. Sampson told jury members that if they accepted Mitchill's testimony on whales, they were obliged to accept a lower place for their own kind in the natural order. As a result, Mitchill's day in court did not go smoothly, not least because he was forced to acknowledge serious disputes among his peers regarding exactly how to classify biological organisms. Sampson then took aim at Mitchill himself and what he represented: privileged aristocrats from the scientific community who had lost touch with reality. The smooth-talking Sampson then claimed Mitchill's beliefs had their origin in Europe – something he rightly judged would infuriate the citizens of always-independent New York. This revolutionary new thinking, Sampson argued, was something that honest working New Yorkers could do without. No longer was this a case about barrels of oil, but the proper place of scientific knowledge in the U.S.A.

Ultimately, what won the case for Samuel Judd were not Mitchill's scientific arguments, but testimony from a different sphere altogether. In New York's markets, the merchants implicitly understood that whale oil and fish oil were not the same: whale oil could be used as a fuel for lamps because it could be burned without giving off smoke; fish oil, on the other hand, was nasty, impure stuff used primarily in tanning leather. In the end it was this testimony that led to Judd's victory.

The trial of the whale still has relevance today, when the court of public opinion remains easily swayed by sceptics. The 1818 trial was really about this question: who gets to decide on the place of the natural world in the human world – scientific experts or public opinion? Whether the issue today is the effects of human activity on the climate of this planet, or one of many other contemporary topics, the legacy of Judd's case continues to be of relevance.

Questions 1–7

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

1 An inspection fee on fish oil was introduced in New York in 1818.

2 Samuel Judd argued that the inspection fee should exclude whale oil.

3 Judd had been in trouble with city officials before the inspection fee disagreement.

4 Many New Yorkers were interested in the court case at the time.

5 Traditionally, non-human creatures had been classified in one of three groups.

6 Generally speaking, ordinary people thought fish were the lowest form of life.

7 Whales were excluded from the Linnaean system in 1818.

Questions 8–13

Complete the notes below.

Write **ONE WORD ONLY** from the text for each answer.

The Trial of December 1818

The Personalities

- Samuel Mitchill worked as a congressman and a (8)_____________________ .
- The defence wanted Mitchill to present the biology of the case.
- William Sampson called (9)_____________________ as witnesses in order to appeal to the common sense of the jury.

The Arguments

- Sampson's case was based on the consequences for humans if Judd won.
- Mitchill admitted that scientists had disputes about classification.
- New Yorkers disliked Mitchill because his ideas came from (10)_____________________.

Conclusions

- In the end it was statements from local (11)_____________________, not Mitchill's testimony, which helped Judd win.
- Whale oil made a good (12)_____________________ because it was clean.
- Judd's case is relevant today, e.g. in the debate about Earth's (13)_____________________.

Herbal Medicine

A There is an age-old practice of harvesting plants and herbs in their natural environment for use as medicines. And today there is huge potential for New Zealand to develop a herb industry based on the excellent growing conditions and expertise there, according to Phil Rasmussen, a pharmacist and medical herbalist. Take arnica for example, a popular pharmaceutical herb used to treat bruises and joint problems. Traditionally collected by Romanian communities in Europe, it is now in high demand worldwide as interest develops in the capabilities of the small alpine plant. A 2008 report for the Plant and Food Research organization concluded that New Zealand has a good opportunity to cultivate arnica flowers and roots for the international markets. However, the initiative was stopped in its tracks when the government abruptly halted funding for the research programmer. It was an unjustified move, according to agronomist Malcolm Douglas, based on a number of inaccurate views about weed invasion.

B The history of herbal medicines in New Zealand has long featured disagreements of this sort. For the early Maori people the original inhabitants of New Zealand the forest was well stocked with edible plants that were an obvious source of nutrition, but that were taken for the relief of pain as well. While the earliest European doctors in New Zealand relied on imported dried herbs, many were keen to include native plants in their practices: in his book published in 1891, herbalist James Neil described manuka and koromiko as among New Zealand's most valuable herbs. Despite its popularity among some, however, herbalism continued to have its detractor. In 1907 Neil, president of the then very young New Zealand Association of Medical Herbalists (NZAMH), petitioned parliament for legal status for herbalists, but he was unsuccessful. The Evening Post newspaper perhaps summed up the opposing position by claiming that herbalism 'is obsolete'.

C In fact, traditional Maori medicine faced a more determined challenge. In 1908 the government passed a controversial law that had the effect of restricting traditional herbal practice, or pushing it underground. Then for a brief period in the mid-20th century, herbal medicine was largely ignored, shunned by the majority of the medical profession, and absent from medical school curricula. But a centuries-old tradition was not going to disappear so easily, and in the 1980s the NZAMH was revived, and it became possible to complete a course in herbal medicine at several polytechnics around the country. However, the problem remained of how to connect the culture of plant-based medicine with conventional scientific thinking in order to promote herbal use within the general population. For many years, the limited evidence there was that herbal medicines worked was undermined by lack of interest among general practitioners and within the scientific community.

D Today, the ideas of herbalists in the 1980s-eat a varied diet, include lots of fresh fruit and vegetables, recognise stress - are completely accepted by the medical establishment and widely practiced in society as a whole. Natural health products are big sellers in pharmacies, and global pharmaceutical companies are buying up natural supplement brands or developing their own.

E What’s more, according to Rasmussen, robust clinical trials show that herbal medicine is generally safe-safer than most drugs. ‘It doesn’t do everything,’he says, ‘but there’s a lot it does do, particularly in terms of preventative health care.’One significant issue for today’s export-oriented herbal medicine producers is the question of how to guarantee standards for consumers in different countries. In other words, there is the need for some form of globally recognised system of documentation. Rasmussen's range of extracts are produced under the Good Manufacturing Practice (GMP) scheme, which is respected around the world. So too is the range produced by Sandra Clair, who says that such assurance is expensive but necessary if you want to export herbal remedies to the rest of the world. Moves to launch a joint Australia-New Zealand agency to regulate herbal remedies under a single, streamlined licensing process have recently been revived, after being abandoned in 2007 through lack of support in parliament.

F There are those in the industry who support further regulation still. According to Rasmussen, some herbs should require a prescription from a suitably qualified medical herbalist or doctor. For example, consumers shouldn't be able to go to their local supermarket and buy St John's Wort, according to Rasmussen, because it can interact in harmful ways with at least ten pharmaceutical drugs. Isla Burgess, who is part of the International Research Group for the Conservation of Medicinal Plants, agrees that tighter regulation is necessary,' but for a different reason. 'More than 400,000 tones of medicinal and aromatic plants are trade in the world each year,' says Burgess. 'The great majority of these are harvested from the wild, so they each have an impact on their local ecosystem.' She gives the example of elm trees in the USA ringbarked and stripped for the growing market for a product called 'slippery elm': this endangered tree should be protected. But others argue that more regulation would be prohibitively expensive for all but the largest manufacturers - a change, cautions Clair, that would probably put some local companies out of business[24.1]. So, for the time being at least, it seems that the topic of herbal medicines will continue to provoke debate.

Questions 14–17

Which paragraph contains the following information?

NB *You may use any letter more than once.*

	A	B	C	D	E	F
14 a reference to the interest shown by large corporations in herbal remedies						
15 examples of the uses of one particular herbal medicine						
16 a warning that small companies cannot afford stricter controls of the herbal medicine industry						

17 a statement by one expert about the effectiveness and limitations of herbal medicines						

Questions 18–21

Complete the summary below:

Write **ONE WORD ONLY** from the passage for each answer.

The history of herbal medicines in New Zealand

Originally, the Maori people consumed plants to help deal with (18)__________________ and also as food. When Europeans settled in the country, a (19)__________________ by James Neil showed that some of them also recognized the medicinal value of native plants. However, criticism of herbal medicine appeared in one newspaper in 1907. The following year, the use of herbal medicines was made more difficult because of a new (20)__________________, and for a time in the mid-20th century, they were largely ignored. Then, in the 1980s, a number of institutions started offering a (21)__________________ in the subject, although for many years there was still little evidence to support their use because doctors and academics were not interested.

Questions 22–26

Look at the following statements (Questions 22-26) and the list of people below.

Match each statement with the correct person, A, B, C or D.

NB *You may use any letter more than once.*

List of People

A Phil Rasmussen

B Malcolm Douglas

C Sandra Clair

D Isla Burgess

	A	B	C	D
22 There ought to be restrictions on where you can buy some herbal medicines.				

23 The authorities stopped supporting one project without a good reason.				
24 The herbal medicine industry has an effect on the environment where some plant-based medicines are found.				
25 New Zealand has the human resources and natural environment to grow herbs commercially.				
26 It is essential for herbal medicines to have international certification, despite the cost.				

Science in the kitchen

Chefs are bringing a new standard of experimentation and precision to their cooking.

There is a recent movement in the world of food, in which chefs are collaborating with scientists to teach themselves the chemistry and physics of cuisine. Even academics are getting excited about the results. Colin Osborne of the Royal Society of Chemistry in London is enthusiastic: “Chefs are using unusual methods to produce exciting dishes that would be impossible without modern science,” he says. You may wonder what’s wrong with long established culinary traditions. The fact is, many culturally ingrained cooking methods are less than perfect. Osborne gives the example of the common belief that frying meat seals in moisture, while researchers who weighed the meat actually found that moisture is lost in the process. Another example is the age old technique of adding salt when boiling vegetables to raise the water’s boiling point, thus cooking the vegetables faster. In fact, the amount of salt typically added does not raise the temperature significantly – or improve the flavour, since only a minuscule amount is absorbed.

Hervé This, director of the Molecular Gastronomy team at the French National Institute for Agricultural Research, spends much of his time trying to disprove culinary old wives’ tales. He is empirically testing traditional beliefs about cooking and disproving the more absurd, tackling such questions as whether it’s better to add vinaigrette to potato salad while the potatoes are still hot. “The first modern chemists used kitchen equipment to do their experiments,” Hervé This explains. “Since then, chemistry has undergone massive changes – but cooking methods have remained largely as they were in the Middle Ages.”

“It’s seriously important work,” says Peter Barham, a physicist at Bristol University. “If you understand what’s going on in cooking, you’ll be better equipped to improve it.” Barham contends that it’s difficult to get consistent results from cookery books, because recipes are typically poorly written. In stark contrast, he notes, scientific papers are subject to peer review, whereby experts pore over experiments to ensure they can be accurately reproduced.

Barham also collaborates with leading British chef Heston Blumenthal, proprietor of The Fat Duck, a restaurant in the south of England. The restaurant is widely regarded as one of the best in the world, serving delightfully unexpected dishes such as nitro scrambled egg and bacon ice cream.

When Simon Campbell of the Royal Society of Chemistry bestowed an honorary fellowship on Blumenthal for creative applications of science to cooking, he said: “The scientific community admires and respects the research that Mr Blumenthal has performed to harness cuisine to science. Through his inquisitive and innovative approach to food he has underlined spectacularly how chemistry permeates all aspects of texture, taste and smell.”

Although some dishes sound gimmicky, this innovative approach to cooking is paying off. El Bulli in Catalonia, Spain – directed by chef Ferran Adrià – is another leading restaurant thus enthusiastically engaging with scientific techniques. It closes for six months of the year (to allow six months for research and development), yet is rumoured to be booked out for an entire year in advance.

Such restaurants are part of the movement known as ‘molecular gastronomy’, an expression coined by physicist Nicholas Kurti, working in collaboration with Hervé This. Kurti once quipped that “it is a sad reflection that we know the temperature inside the stars better than the temperature inside a **soufflé***.” Kurti and Hervé This devised the expression ‘molecular gastronomy’ during the 1980s to denote the science of culinary transformations and eating phenomena, and differentiate it from food science.

“Twenty years ago the worlds of science and cooking were neatly compartmentalised,” agrees author Harold McGee, a top food science writer. “There was food science: an applied science mainly concerned with understanding the materials and processes of industrial manufacturing. And there was the world of domestic and restaurant cooking, traditional crafts that had never attracted much scientific attention.”

A lot has changed in the two decades since he published his influential book on the topic. In a revised edition, McGee says the book was “riding a rising wave of general interest in food, a wave that grew and grew, and knocked down the barriers between science and cooking, especially in the last decade. Science has found its way into the kitchen, and cooking into laboratories.”

So what does the future hold? Rachel Edwards Stuart is a graduate PhD student who is studying some remarkable food additives, including modified cellulose gels that solidify on heating and melt again as they are cooled. The idea is to make dishes that develop different flavours as they are eaten. Her other project is creating drinks that change flavour.

“The concept came from Roald Dahl’s children’s book Charlie and the Chocolate Factory, where Willy Wonka makes a bubble gum that is a whole meal in one sweet,” she says.

Unfortunately, Edwards Stuart was unable to say more, due to a confidentiality agreement with the restaurant for which she conducts her research.

While Hervé This, Blumenthal and Edwards Stuart are the pioneers, the next phase will be to bring science into kitchens at home. Already there are books that provide an insight into the wondrous chemistry that turns humble ingredients into cuisine. And as the movement grows it will not be long before we see laboratory test tubes, flasks and maybe the odd centrifuge on sale next to carving knives, rolling pins and pressure cookers.

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soufflé*:A French dish made using beaten eggs

Questions 27–31

Choose **YES** if the statement agrees with the claims of the writer, choose **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

27 Scientists and chefs have a long established history of working together.

28 Traditional ways of cooking tend to be supported by modern scientific research.

29 The food produced by Heston Blumenthal at The Fat Duck is unconventional.

30 El Bulli is the most popular restaurant of its kind in Spain.

31 McGee has plans to open his own restaurant.

Questions 32–35

Choose the correct answer.

32 The purpose of Hervé This's research is to

- determine how chemistry has influenced modern cooking.
- provide a scientific basis for traditional cooking methods.
- show that long held beliefs about cooking are wrong.
- offer practical advice to those who cook at home.

33 According to Peter Barham, one difference between cookery books and scientific papers is that

- scientific papers are checked by more people.
- the writers of cookery books need not be qualified.
- the language used in scientific papers is more complicated.
- recipe writers can profit more financially than scientific writers.

34 Nicholas Kurti referred to a soufflé in order to

- give an example of a dish that can easily be ruined by excess heat.
- highlight the inadequacy of scientific research into cooking.
- show that cooking is similar to other scientific processes.
- confess his own limitations as a cook.

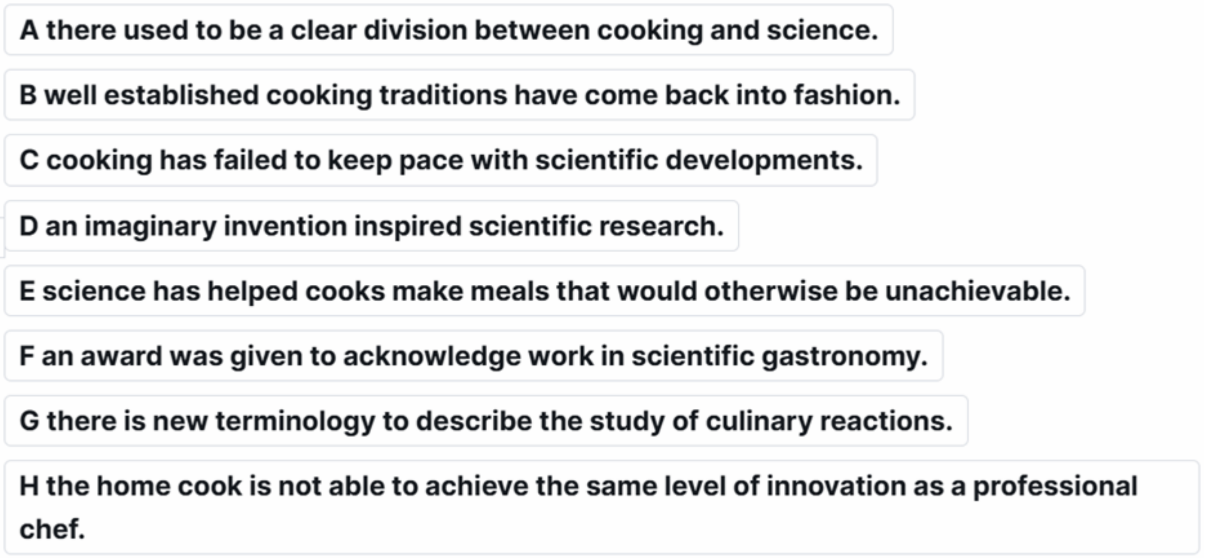
35 One aspect of Rachel Edwards Stuart's research involves

- matching solid food to complementary liquids.
- determining which tastes appeal to young people.
- studying how food changes form in certain conditions.
- evaluating the risk of damage from using preservatives in food.

Questions 36–40

Complete each sentence with the correct ending, **A–H**, below.

List of Endings



A there used to be a clear division between cooking and science.

B well established cooking traditions have come back into fashion.

C cooking has failed to keep pace with scientific developments.

D an imaginary invention inspired scientific research.

E science has helped cooks make meals that would otherwise be unachievable.

F an award was given to acknowledge work in scientific gastronomy.

G there is new terminology to describe the study of culinary reactions.

H the home cook is not able to achieve the same level of innovation as a professional chef.

Colin Osborne explains that (36)_______________

Hervé This's research has led him to the view that (37)_______________

Thanks to the joint effort of Nicholas Kurti and Hervé This, (38)_______________

Food writer Harold McGee says that (39)_______________

Rachel Edwards Stuart gives an example of a case where (40)_______________

TEST 11

The Origins of Weather Forecasting

The world's first public weather forecast appeared in The Times newspaper over 150 years ago: the beginning of a service that gives everyone something to comment on. The pioneering forecast on August 1, 1861, was introduced with a deceptively simple heading: ‘General weather probable during next two days.’ But those few words started an ongoing controversy that still continues today – after all, everyone remembers the forecasts that go wrong, but rarely the ones that are right. The first forecast was the idea of Admiral Robert FitzRoy, head of the newly founded Meteorological Department, and one of Britain's greatest but least-known heroes. It was a brave undertaking, because in those days predicting the weather had gained a reputation similar to astrology or fortune-telling. The few people who attempted it had become a national joke when their forecasts inevitably went wrong.

FitzRoy was different, though. His background was faultless, most famously his captaining of the ship HMS Beagle on Charles Darwin's voyage around the world, which eventually led to the publication of Darwin's well-known book On the Origin of Species. When FitzRoy retired from active service as an admiral in Britain's navy, he was looking for a new direction. He subsequently secured a job as chief statistician at the Meteorological Department, part of the Board of Trade. Parliament had voted to set up and fund the Meteorological Department on June 30, 1854, to chart the safest sailing routes across the Atlantic Ocean. However, the British Government was not impressed with the idea of collecting weather reports and establishing a weather forecast, and the suggestion by one Member of Parliament for this was met with laughter from the other MPs.

FitzRoy was given a staff of three clerks in a small office in London, but he soon grew bored with the tedium of transcribing thousands of ships’ reports. Instead, he focused on a much more pressing issue – the huge loss of life at sea from storms. This problem came to a head in 1859, when gale-force winds sank the ship named Royal Charter, with the loss of 430 lives, within sight of the shore. Even in those days when ships regularly sank in storms, the loss of the Royal Charter was considered a national tragedy. FitzRoy stirred up feelings even further when he wrote a letter to The Times newspaper explaining that the storm had been entirely predictable.

That same year, a total of 1,645 lives were lost off the British coast, and FitzRoy wrote repeatedly to The Times pushing for a storm-warning service for shipping. This was just the right moment for a national forecasting service. Knowledge of the weather was improving, barometer readings gave warning of approaching storms, and the invention of the electric telegraph and Morse code in 1844 gave instant communication for the first time.

So in February 1861, FitzRoy pressed ahead with a storm-warning service. Previous weather reports had been unreliable, but FitzRoy's innovation was to issue ships with standardised instruments which allowed for accurate weather reports. At exactly the same time each day the information was sent to him by telegraph, and he was able to draw up more detailed weather maps. The approach of an incoming storm could be recognised, and from London, FitzRoy could telegraph warnings to ports on the coast, where an ingenious system of flags was hoisted up high for passing ships to read. This represented the biggest advance in shipping safety after the introduction of the lifeboat, and in subsequent years the number of lives lost around Britain fell by about a third. FitzRoy became a hero to the fishing and maritime fleets. Encouraged by his storm-warning success, FitzRoy then started a public weather forecasting service. As he had a close connection with The Times, this newspaper introduced his daily forecast in August 1861. It attracted huge attention, including from Queen Victoria, who regularly sent messengers to FitzRoy's office to get a forecast for the sea crossing over the Solent to an island which she liked to visit off the south coast of England. He was also popular with ordinary fishermen, who were happy not to be out at sea in bad weather. The owners of fishing vessels, however, were not supportive of FitzRoy's forecasts, which often caused delays for them when bad weather was forecast.

Nevertheless, weather forecasting at that time was very difficult, and one mistake could result in much bad publicity. It wasn't long before some forecasts turned out wrong, and the letters pages of The Times were full of heated correspondence.

It is indisputable that FitzRoy was way ahead of his time, but it is only in recent years that he has been recognized as a towering figure in meteorology, with the honour of an area of sea being given his name in the shipping forecast (a radio broadcast of weather reports for the seas around Britain). His extraordinary determination to get forecasting established cost him dearly though, and he died prematurely. But his legacy lives on, because late in his life he published a book about weather forecasting which was recognized by other scientists to be well ahead of its time.

Questions 1–5

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

1 In Robert FitzRoy's time, weather forecasting was a respected skill

2 When FitzRoy retired from the navy, he had already had a successful career at sea

3 FitzRoy faced competition from other applicants for the chief statistician's job

4 The British Parliament supported the idea of regular weather forecasts in 1854

5 Progress in technology made it a good time for publicly available weather forecasting to begin

Questions 6–13

Complete the notes below.

Write **ONE WORD ONLY** from the passage for each answer.

February 1861: Storm warning service

- FitzRoy received weather reports produced by ships using reliable (6)_________________
- simultaneous weather reports were taken daily
- storm warnings were telegraphed to (7)__________________ along the shore
- signals for ships were displayed using raised (8)__________________
- the storm warning service was the greatest development in sea safety since the (9)__________________ was introduced

August 1861: Public weather forecasting service

- very popular in The Times newspaper
- frequently used by the English Queen for safe trips to a favourite (10)__________________
- FitzRoy's forecasts were popular with fishermen but not with boat (11)_________________
- in modern times FitzRoy's (12)__________________ is used for a marine area
- FitzRoy produced a (13)__________________ which was respected by the scientific community

The importance of icebergs to ocean life

A The word iceberg refers to pieces of ice larger than five meters across. The waters surrounding Antarctica are home to most of the icebergs on Earth, although they can also be found in the Arctic region. The water surrounding icebergs teems with life including a range of fish and, consequently, the seals which prey on them. Seabirds such as gulls, fulmars and other birds often visit as well. Some fishermen in Arctic regions claim that the fishing is often best in the immediate vicinity of icebergs. Recent research is beginning to shed light on what it is about icebergs that is attractive to wildlife.

B Ken Smith, senior scientist at the Monterey Bay Aquarium Research Institute, explains that "free-drifting icebergs are hot spots of chemical and biological enrichment. His studies in the Weddell Sea off Antarctica confirmed high concentrations of chlorophyll, krill, and seabirds in the water surrounding the icebergs he sampled, extending out to about two miles around each berg. While he wouldn't speculate about whether the same results would be found around Arctic icebergs, other scientists say that the evidence suggests it may well be the case.

C During their first expedition, Smith and his research team deployed a series of oceanographic instruments, fishing nets, and video cameras attached to remotely operated vehicles around a small iceberg with a surface area of 0.12 square kilometers, as well as around another much larger example. Their results revealed how important icebergs are to the marine environment.

D Perhaps their most significant finding was that as icebergs melt, accumulated dust, pulverized rocks, and other terrestrial materials are dispersed into the water. These were all incorporated into the ice millions of years ago when it was part of glaciers which scraped up debris from the surface of the soil while moving across huge areas of land. Once in the water, these materials act as ocean fertilizer to nourish microscopic marine organisms such as plankton, upon which the entire food chain ultimately depends. These icebergs can be compared to river estuaries that supply surrounding coastal regions with nutrients as they enter the ocean,' Smith and his team wrote.

E Oceanographer Greg Stone had a more hands-on approach to studying the productivity around icebergs. A vice president at Conservation International, one of the world's largest biodiversity conservation organizations, he led a team of scuba divers and scientists on a rare and dangerous expedition to study iceberg ecology around B-15, the largest iceberg ever known, which broke away from the Ross Ice Shelf in Antarctica in 2000. Nearly the size of the US state of Connecticut and containing enough fresh water to supply the entire US for five years, the berg had begun to break up by the time Stone's team arrived several months later, and the shifting pack ice made it impossible for them to reach it. But Stone and his colleagues still conducted about ninety dives around icebergs of various sizes. What they found was an unexpected bonanza of marine life in and around the ice.

F Greg Stone noted that the water of Antarctica where his team undertook dives was several degrees below freezing. Like Smith's team, they recorded higher concentrations of jellyfish and krill within a mile or so around the icebergs. They also frequently saw juvenile ice fish living in burrows in the ice, though they were uncertain whether the fish excavated these themselves to hide from predators or simply took advantage of natural features of the ice. In an especially dangerous dive, they swam 300 meters into a cave inside another iceberg that had been grounded for several years and found a spectacular garden of invertebrates - feather duster worms, starfish, colorful sponges, sea cucumbers, and more - living on the seafloor at the farthest reaches of the cave.

G According to Stone, most Antarctic icebergs get pushed around continuously by the wind and currents. As they move, their keel will rub along the seafloor, disturbing the benthic ecosystem. But because this particular iceberg had been grounded for several years, it served to protect bottom-dwelling creatures from the ravages of moving icebergs and nurtured this underwater garden.

H Stone agrees with Smith's conclusion that the big picture of iceberg ecology is the vital role they play in fertilizing the Southern Ocean, thereby creating the largest biomass on Earth. The whole food chain gets fired up around one of these things,' Stone explains. 'The ice is the biological engine that drives the ecosystem, fueled further by the Antarctic's twenty-four-hour summer sunshine. There's no doubt that if you're an ocean animal, you're going to be attracted to an iceberg because it's generally a better place to be."

I If you're not an ocean animal, on the other hand, it's probably best to keep your distance from icebergs, because one thing they are not is safe. Just hours after Stone's dive team emerged from exploring the cave within the grounded iceberg, the entire berg completely crumbled and disintegrated, leaving in its place what Stone described as 'two square miles of shattered crystal'. The pressures caused by the continuous melting and re-freezing of water throughout these mountainous structures ultimately lead to their destruction. As frightening as it was to Stone and his team of scientists, who decided then and there never to dive in an iceberg cave again, it also may have been the first time anyone had witnessed such an event.

Questions 14–19

Reading Passage 2 has nine paragraphs, A-I. Which paragraph contains the following information?

Choose the correct letter, **A-I**, in boxes **14-19**.

***NB** You may use any letter more than once.*

	A	B	C	D	E	F	G	H	I
14 examples of equipment used in the study of icebergs									
15 a description of the volume of water inside one iceberg									

16 a reference to causes of instability in icebergs									
17 an explanation as to the origins of the contents of the water around icebergs									
18 a definition of the term 'iceberg'									
19 a reference to the temperature of the water surrounding an iceberg									

Questions 20–21

Choose **TWO** correct answers.

20-21 Which TWO of the following are true about Ken Smith's findings?

- Ken Smith likened iceberg melt to river estuaries.
- He obtained all his results from a single Antarctic iceberg.
- He confirmed that all icebergs had identical ecosystems.
- He connected iceberg contents with surrounding marine life.
- He was the first to note bacteria around icebergs.

Questions 22–26

Complete the summary below.

Write **ONE WORD ONLY** from the passage for each answer.

Iceberg ecosystems

On his dives in Antarctica, Greg Stone and his team noted the presence of above-normal levels of marine life, such as krill and (22)________________ in the immediate vicinity of the ice. They also observed that under many icebergs, young fish appeared to have created (23)________________ to live in - possibly as a means of avoiding (24)_______________. Under one iceberg, they located a stunning display of sea cucumbers, sponges and other invertebrates living deep within a (25)___________________ in the ice. These had probably survived because the iceberg in question had become stuck on the seabed rather than being blown around or moved by ocean (26)___________________.

The Dunedin study

The New Zealand city of Dunedin in the early 1970s can easily be made to sound idyllic. There was next to no unemployment and people left their doors unlocked at night. New Zealand was then the ninth richest country in the world and many residents believed that, as a place to bring up children, this was a city without rival. However, Phil Silva, an educational psychologist, was not so certain and decided to take a closer look. Silva identified those children born in the year from April 1, 1972 whose mothers were still living in the city three years later. The parents were asked if they would mind bringing their children in for a health and development assessment. Incredibly, no fewer than 91% agreed to help and 1037 three-year-olds completed half a day of tests and experiments. In the process, the Dunedin Multidisciplinary Health and Development Study was born.

There was precious little money at Silva's disposal, so the assessments were done in a church with the help of dozens of volunteers. Each child was assessed against a range of measures such as height, weight, and head circumference. Language skills were assessed and profiles of behaviour were compiled. However, one set of assessments was never going to satisfy Silva's curiosity, so when the children were five, his same team asked the parents to bring the children back for a second study. Of the original 1037 children, 96% came. The data gathered at age three was updated and new measurement criteria – discipline, nutrition, dental health - were introduced.

By 1978, Silva was able to shock the nation with his findings: one in four children had delayed language development; 15% had ear problems; the researchers had identified one child who was blind and another who might have died from undetected skin cancer. New Zealanders, Silva declared, were more diligent about their cars than their children. Cars were required by law to be regularly checked; if children were treated similarly, ideally at behavioural clinics in schools, problems could be picked up in time to prevent lasting damage.

The parents were asked to bring their children back at ages seven, nine and 11 to the old church for further assessments. Crucially for the study's survival, the politicians were finally starting to take note and government funding began to trickle in. By the time the children returned at age 13, the study had taken up residence in an abandoned building tucked behind the dental school. It wouldn't have been the researchers' first choice, and was certainly not grand, but it was at least a site for the long term and its acquisition represented a landmark in the study's development. It was to this building that the participants returned at ages 15, 18, 21, 26 and, most recently, at 32.

Among the most recent findings are that birth complications - a focus of Silva's original research - don't necessarily set children up for problems as they mature in later life, although the amount a newborn infant weighs is associated with IQ. Paediatric textbooks had insisted for years that breast-feeding protected against medical problems like asthma and allergies. The Dunedin study has shown that assumption to be incorrect. Other findings that challenged the received wisdom include the fact that thumb-sucking does no harm; birth order makes no difference to later development; and pre-schoolers whose mothers work are not disadvantaged. Overall, the study has confirmed the notion that broad personality traits are laid down by the age of three. Along the way, the Dunedin researchers have been able to contradict old assumptions and explode medical myths long held by the profession.

The Dunedin study is important not only because of its findings, however. It also provides a model because of the extraordinary commitment of study members. No other longitudinal research project in the world matches its retention rate of 96% at age 32. Silva concedes that luck has a lot to do with this: Dunedin city was, and largely still is, close-knit, homogeneous and devoted to its university and medical school. It is large enough to produce a study population that produces findings that can be generalised to New Zealand and other developed countries, yet small enough that one in every 10 households has had a child or relative in the study.

More important than circumstance, though, was the approach taken by the researchers. Silva recalls that by year 13, participation had dropped off - only 82% came in for assessments. He realised the most important asset they had was the sample group and these people must be nurtured at all costs. He spent many long hours out in the field, finding those participants who had gone adrift and persuading them to come in. Study members are kept up to date with the steady flow of findings to which they have contributed. Privacy is absolutely paramount: Silva won't even say how many of the study members are now in prison: nothing must erode the trust that's been built up over the years.

Today, more than a quarter of the sample live overseas so the study also has its own travel agent, who does her best to accommodate requests to spend Christmas in Dunedin with family. This is just one example of the enormous effort that goes into maintaining contact and removing obstacles to participation. With such diligence and care, researchers hope the Dunedin study will continue for many years, perhaps generations, to come.

Questions 27–32

Choose the correct answer.

27 What does the writer say about Dunedin in the 1970s?

- It was the safest city in the country.
- It was less prosperous than other cities.
- Many people were frustrated that they could not find a job.
- It was wealthy and seen as an ideal place to raise children.

28 What did the writer find surprising about Phil Silva’s original study?

- That the study was held in a church.
- That the tests took half a day.
- That 91% of parents agreed to help.
- That the study used volunteers.

29 What was Silva's main finding in 1978?

- Children had excellent language.
- Many children had developmental problems.
- No children had ear problems.
- All children were healthy.

30 What was different about the first and second studies?

- The sample group was smaller in the first study.
- The second study produced conflicting results.
- Helpers were not used in the second study.
- The second study collected additional types of information.

31 What problem did Silva face when conducting the original study?

- A shortage of helpers.
- A lack of available funding.
- The bad behaviour of some children.
- The poor language skills of the participants.

32 Why does the writer mention the new building in the fourth paragraph?

- To show how generous project funding had become.
- To show that the study was being taken seriously.
- To emphasise the temporary nature of the facilities.
- To highlight that the children disliked the site.

Questions 33–36

Choose **YES** if the statement agrees with the claims of the writer, choose **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

33 Recent results suggest that intellectual development and birth weight are linked.

34 Medical textbooks used to claim that breast-fed children were more intelligent.

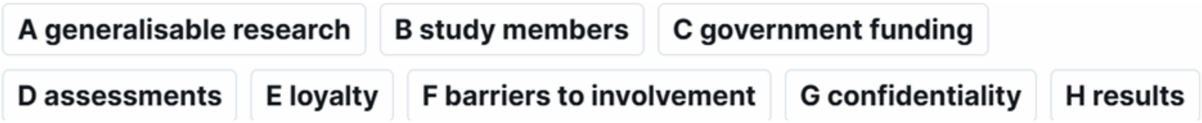
35 Children who suck their thumbs are prone to developmental problems.

36 The findings of the Dunedin study have challenged some doctors' preconceptions

Questions 37–40

Complete the summary below by dragging each phrase to the correct gap.

Available phrases



A generalisable research
B study members
C government funding
D assessments
E loyalty
F barriers to involvement
G confidentiality
H results

A model study

The success of the Dunedin project has been put down to two principal factors: good fortune and Phil Silva's methodology. The demographics of Dunedin mean that residents feel committed to the study, and that it also provides (37)__________ that can be applied both nationally and internationally, but even more important was Silva's conviction that the (38)__________ must be looked after; nothing should be done to threaten the study's (39)__________ and as a result Silva is cautious when questioned, and a lot of work is done tominimise (40)__________ in order to ensure that the study continues into the future.

TEST 12

Candles

One of the earliest forms of portable illumination, candles have served vital functions for humankind throughout history, a fact chronicled through the use of candles or candle-like objects in virtually every society. Historians believe the original candle may have been invented by early humans who dipped dried branches from trees into animal fat, thus producing a slow-burning and reliable source of light. Ancient Egyptian artworks depict the use of candles by writers and philosophers who worked long after sundown. These early candles were most likely developed from tapers that were made of fibrous materials mixed with wax or with tallow, the white, nearly tasteless fat of cattle or sheep also used to make soap.

A major improvement in candle making materials came in the Middle Ages, when beeswax was preferred over animal or vegetable fats candles were introduced to Europe. Beeswax was preferred over animal or vegetable fats because it smelled pleasant and did not produce as much mess as other fats. During this time, candles were primarily used as a source of illumination. However, this was not their only purpose. In the 15th century, for example, candles were used as a means of keeping time. At auctions, the bidding time was limited by inserting a pin into a candle and letting the wax melt until the pin dropped, thus concluding the period in which a bid could be made.

The growth of the whaling industry in the late 18th century brought another major change in candle making materials, as spermaceti wax, which was extracted from the oil of the sperm whale, became more widely available. Spermaceti wax was popular because it provided a significantly brighter light and burned evenly. Ozokerite, a colorless mineral hydrocarbon wax, was also popular in the 17th and 18th centuries, particularly in warmer weather, when its relatively high melting point meant it remained firm. Paraffin, a wax crystallized from petroleum, became popular during the 1860s. It was eventually blended with spermaceti and ceresin — a byproduct of refined petroleum oil. This created a more durable wax, and, thanks to the fact that it resulted in inexpensive candles of reasonably high quality; its use was widespread by the end of the 19th century.

Additional passage (candle making process & modern candles)

The candle wick, the length of soft material which runs through the middle of the candle, was made from a variety of natural fibers. In 1824, Frenchman Jean-Jacques Cambaceres introduced an important refinement to wick technology with the plaited wick, which consisted of several strands of material woven together. This burned more evenly than unplaited wicks. Although candle making materials have changed through the years, the art of candle making has remained surprisingly similar to the original production process.

Originally, candles were produced by hand using an approach known as the dipping method. Dating back to the Middle Ages, the method involved the use of wicks made from rushes. These were repeatedly dipped into molten fat until the desired thickness of fat had stuck to them. In the pouring method, which was introduced later, melted beeswax was poured over a suspended cotton wick while the wick was manually twirled. After a sufficient amount of wax had gathered at the bottom of the wick, the candle was reversed and wax was poured from the other end.

It was not until the 1830s that the large-scale manufacture of candles became a reality when British manufacturer Joseph Morgan introduced the first mass-production candle making machine. Today's modern machines are strikingly similar to Morgan's original machine, with speed and the quality of the finished product being the only major differences.

In today's manufacturing process, different substances are often mixed together to create stronger candles with higher melting points. In the United States, for example, standard commercial candles are made of paraffin, stearic acid and beeswax. Some candles also contain small amounts of candelilla, which comes from the stem of the candelilla shrub, or carnauba wax, which is from the leaves of the carnauba palm.

In the many decorative candles that are made, waxes other than beeswax and paraffin are used. One example is bayberry wax, which is derived from the fruit of the bayberry bush and has a distinctive aroma. In decorative candles, non-burning wax is used to make the casing, which is not intended to melt.

Today's wicks are made of a high grade of cotton or linen. The material is woven (or plaited) so that it will burn in one direction and will curl so that its end remains in the candle flame's oxidizing zone for even and intense burning. Often, these wicks have a center made of wire that allows them to burn slightly hotter than cotton and remain erect in the melted wax.

Questions 1–5

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

1 Artwork from ancient Egypt indicates that the use of candles was limited to royalty.

2 Tallow was produced exclusively for candle making.

3 In the Middle Ages, candles made from beeswax were more popular than those made from other substances.

4 Keeping time at auctions in the 15th century involved marking lines on the surface of a candle.

5 The candles used at auctions had to be of good quality.

Questions 6–13

Complete the notes below.

Write **ONE WORD ONLY** from the passage for each answer.

Candle making

Advantages of the various types of wax used in candlemaking

- beeswax made less (6) ____________________ than animal fats
- spermaceti wax produced a stronger (7) _____________________
- ozokerite did not melt when the (8)____________________ was hot
- paraffin blend made good quality candles which were inexpensive

The candlemaking process

- in the dipping method, wicks were made from rushes
- in the pouring method, melted beeswax was poured over a wick that was made of (9)________________________

Candlemaking today

- wax can be obtained from the stem of a (10)________________________ called candelilla
- bayberry wax, used in decorative candles, comes from the plant's (11)________________________
- the (12)________________________ of a decorative candle is made from wax which can resist heat
- (13)________________________ is often used to keep the wick of a candle upright

Introduction to a book about the assessment of carbon footprints

A As this book is about ways of measuring the carbon footprint of particular things, I should start by making it clear what I mean. I am using the word 'carbon' as shorthand for all the different global-warming greenhouse gases, and I am using the word 'footprint' as a metaphor for the total impact that something has. So I am using the phrase 'carbon footprint' as shorthand to mean the full climate-change impact of something. That something could be anything – an activity, an item, a lifestyle, a company, a country, or even the whole world.

B Measuring carbon footprints is a long way from being an exact process, whatever anyone tells you, or whatever numbers you might see written on the side of products in some shops. All my numbers are best estimates and nothing more, even though I have reached them as carefully as I can.

C I have used a variety of different methods, and so I have drawn on a range of data sets and models taken from publicly available reports of life-cycle studies. I have also used studies carried out for businesses across different industries by my own company, Small World Consulting, using models that we are developing all the time. Often I have arrived at numbers by a couple of different routes, to check that the results agree with each other. Occasionally, it has been more a case of putting my finger in the air and guessing, but when that has been the case I have tried to make it clear.

D The publicly available data sets I have used were arrived at by two main methods. The first of these, process-based life-cycle analysis, is the most common approach to carbon footprint calculations. It is often referred to as 'bottom-up' because you start off identifying, one by one, all the processes that have had to happen in order for, say, a product to be created. Then you add up the emissions from each process, and that is the footprint of the product. It may sound simple, but it is not at all. It is back-breaking work, and since the number of processes you really need to include is always infinite, the job is never quite complete, so you end up with an underestimate. In fact, the omissions from the calculation are often shocking: they can be fifty per cent or more. To make matters worse, these problems are commonly overlooked, even in the development of government-backed and government-funded guidelines, such as the UK's PAS 2050 standard. But for all the problems, process-based life-cycle analysis is still an essential source of detailed information that can't be gathered any other way.

E The other method is environmental input-output analysis. This is a neat alternative to process-based life-cycle analysis. It is not as popular, perhaps because it is a bit less easy to understand, but it is at least as robust as anything else in the dim world of measuring carbon footprints. It is sometimes called a 'top-down' approach because it begins by looking at the whole economy. It uses macroeconomic modelling to understand the way in which the activities of one industry trigger activities and emissions in every other industry. Input-output analysis' key 'trick' is a piece of ingenious maths (for which a man called Wassily Leontief got a Nobel Prize) that succeeds in capturing the endless ripple effects in a way that is one hundred per cent complete. It has the further advantage that if you know how much something costs, you can get an instant crude estimate of its carbon footprint. It is like a magic trick. And just like all the best magic it is also a bit too good to be true – in many cases the results can be ridiculously general and of little value.

F Input-output analysis is nevertheless a method of choice both because it does not miss things, and because once a specific model has been built it is often easy to use. The basic technique is well established. The specific model I have used is one that was developed at Small World Consulting in collaboration with Lancaster University in the UK, and draws mainly on data obtained from government sources. It was based on a 2007 picture of the UK economy. It deals with all the greenhouse gases, and employs a weighting factor for gases emitted at a high altitude, which have a greater impact than ground-level emissions. A key weakness, which I sometimes adjust for, is that it treats imported products as though they had the same carbon intensity as products from within the UK, whereas in reality imports are usually more carbon intensive.

G Most of the time I have used a combination of life-cycle analysis and input-output analysis to get my numbers. At its best, life-cycle analysis can be more precise, but input-output analysis is often able to get at information that life-cycle analysis is unable to reach. Putting the two methods together is sometimes called a hybrid approach, and the result is a bit like looking through both a microscope and a telescope at the same time. They each show you different things, and between them, if the lenses are clean, you end up with a passable understanding of whatever it is you are looking at.

life-cycle: the stages of a product's life from beginning to end (i.e. from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling)

Questions 14–19

The text has seven paragraphs, **A–G**. Which paragraph contains the following information?

NB *You may choose any paragraph more than once.*

	A	B	C	D	E	F	G
14 reference to an award-winning formula							
15 an acknowledgement of the general shortcomings of carbon footprint calculations							
16 mention of a working partnership							
17 reference to the demanding nature of one way of calculating carbon footprints							
18 the advantage of combining two different methods							
19 a comparison between goods from home and abroad							

Questions 20–21

Choose **TWO** correct answers.

*The list below describes some of the possible features of **process-based life-cycle analysis**.*

20-21 Which TWO of these features are mentioned by the writer of the passage?

- It is more complicated than it sounds.
- It usually produces exaggerated results.
- It is a frequently used procedure.
- Its faults are widely recognised.
- It was first developed in the UK.

Questions 22–23

Choose **TWO** correct answers.

The list below describes some of the possible features of ***environmental input-output analysis****.*

22-23 Which TWO of these features are mentioned by the writer of the passage?

- It is often the basis of national guidelines.
- Its starting point is the manufacturing process.
- It is comprehensive in scope.
- It is a relatively new method of calculation.
- It can use prices to get approximate carbon footprints.

Questions 24–26

Complete the summary.

Write **ONE WORD ONLY** from the text for each answer.

Small World Consulting

Small World Consulting has collaborated with a UK university to develop a version of the environmental input-output model of analysis, using data provided by the (24)_________________________ about the UK economy in 2007. This model is able to take into account the altitude at which greenhouse gases are released. A significant (25)_________________________ is that it does not distinguish between (26)_________________________ of different origin, but the writer occasionally makes allowances for that.

The Science of Shopping

You may have wondered why so many supermarkets are virtually indistinguishable from each other. It is not, as some might suspect, that the companies operating them lack imagination. It is more that they are all well-versed in the science of persuading people to buy things – a science that, thanks to technological advances, is beginning to understand what motivates consumers when they make decisions on what to purchase.

It takes a while for the mind to get into a shopping mode. People need to make a gentle start and take stock of the surroundings. This is why some supermarkets have a so-called ‘chill zone’ for browsing magazines, books and DVDs, an area which is also designed to catch the customer’s eye and tempt them to make impulsive purchases. But many will ignore it, in which case the first thing they encounter is the fresh fruit and vegetables section. For shoppers, this makes no sense. Fruit in particular can be easily bruised, so ideally should be bought at the end, not the beginning, of a shopping trip. But psychology is at work here: selecting wholesome fresh food is an uplifting way to start shopping, and it makes people feel less guilty about reaching for the less nutritious stuff later on.

Shoppers have worked out that everyday items, like milk, will invariably be placed in an aisle towards the back of a store to provide more opportunity to tempt customers on their way there. This is also why pharmacies are generally at the rear, even in ‘convenience’ stores. But supermarkets know shoppers know this, so they use other tricks, like placing popular items halfway along a section, thereby forcing people to walk along the aisle looking for them. The idea is to boost the length of time shoppers spend in a store.

Having walked to the end of the fruit and vegetable aisle, shoppers arrive at counters of prepared food, the fishmonger and the butcher. Then there is the in-store bakery, which can be smelt before being seen. Even small supermarkets now use in-store bakeries. Mostly these bake pre-prepared items, and they have boomed, although central bakeries that deliver to many stores are more efficient. The smell of freshly baked bread can make people hungry, encouraging them to buy not just bread but other food.

There are also numerous ways stores get shoppers to choose particular products. For example, stores encourage customers to buy expensive branded products by arranging them at eye-level, with cheaper ones lower down. Often head offices specify where everything has to be placed and spot-checks are carried out to make sure instructions are followed to the letter. But shelf-positioning is extremely controversial. Despite all the academic papers written on how best to stack shelves, retailers have their own views. While many stores consider eye-level to be the top spot, others think a little higher is better.

Technology is making the process of monitoring shopper behaviour easier, which is why the security cameras in stores may be doing considerably more than watching out for theft. Pictures showing shoppers while they are making their selections can now be analysed. It is possible to see how many shoppers went straight to one brand, the number that hesitated, and those that compared several brands. However, despite the availability of sophisticated technology, researchers have found that simply talking to consumers as they exit the store can yield valuable insights. This low-tech approach has become widespread following comments from stores that data collected electronically tells them little about why so many customers leave without making a purchase. Face-to-face interviews reveal that customers leave shops empty-handed more often because they are ‘unable to decide’ than because prices are too high.

People tell market researchers that they make decisions about what to buy based on logic and common sense, considering issues such as price, quality or convenience. But there are clearly other factors which play a role, such as certain feelings and memories which individuals are not fully aware of. Researchers hired by big stores are now conducting studies using functional magnetic resonance imaging (fMRI), which detects changes in the brain corresponding to increases or decreases in mental activity. Research participants are shown different products and asked questions about them, while scanners reveal their brain activity as they respond. Often, major contradictions are apparent between what they say and what they are thinking. This is immensely valuable information. Eight out of ten new consumer products launched on the market do not succeed, despite having been tested on people who insist they would buy them but who, deep down, may have reservations about the desirability of these products.

This ‘shopping science’ probably has its limits, however. Dr Eric Spangenberg of the University of Washington argues that while it’s unlikely that someone could be persuaded to buy something they don’t need, they might be convinced to choose one brand in preference to another without being aware that this is happening. This claim is also borne out by numerous research findings. But if consumers were to realise quite how much research is being done into the many psychological factors influencing their choices, they might be much more wary of making purchases in the future.

Questions 27–30

Choose the correct answer.

27 What does the writer suggest about supermarkets in the first paragraph?

- They need to try harder to be different from one another.
- They share a similar understanding of consumer psychology.
- They depend too much on the latest technology.
- They should do more to analyse how consumers think.

28 The writer says the function of the ‘chill zone’ in supermarkets is

- to give customers time to decide what they want to buy.
- to present customers with a range of interesting bargains.
- to ensure customers feel under no pressure to buy anything.
- to help customers slowly prepare themselves to go shopping.

29 According to the writer, placing fruit and vegetables near the front of the store

- ensures the customers will feel good about the first products they buy.
- reduces the risk of customers damaging these products later on.
- encourages customers to buy more of these products than they intended.
- makes customers consider healthier options in other sections they visit.

30 What point does the writer make about shoppers in the third paragraph?

- They spend more time in stores than they realise.
- They believe stores make life unnecessarily difficult for them.
- They are aware of some of the techniques used by stores.

- They are confused by frequent changes in the layout of stores.

Questions 31–35

Choose **YES** if the statement agrees with the claims of the writer, choose **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

31 Cheaper products are placed on lower shelves to minimise the likelihood that they will be bought.

32 Head offices should be more flexible about how products are arranged by supermarkets.

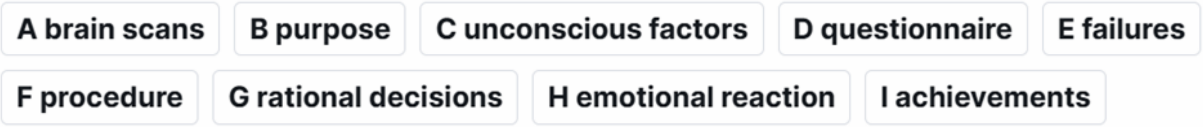
33 There is widespread agreement on how products should be arranged on shelves.

34 Security cameras are a serious threat to customers' privacy

35 Technology is the best tool for determining why shoppers fail to make purchases.

Questions 36–40

Complete the summary using the list of words and phrases, **A-I**, below.

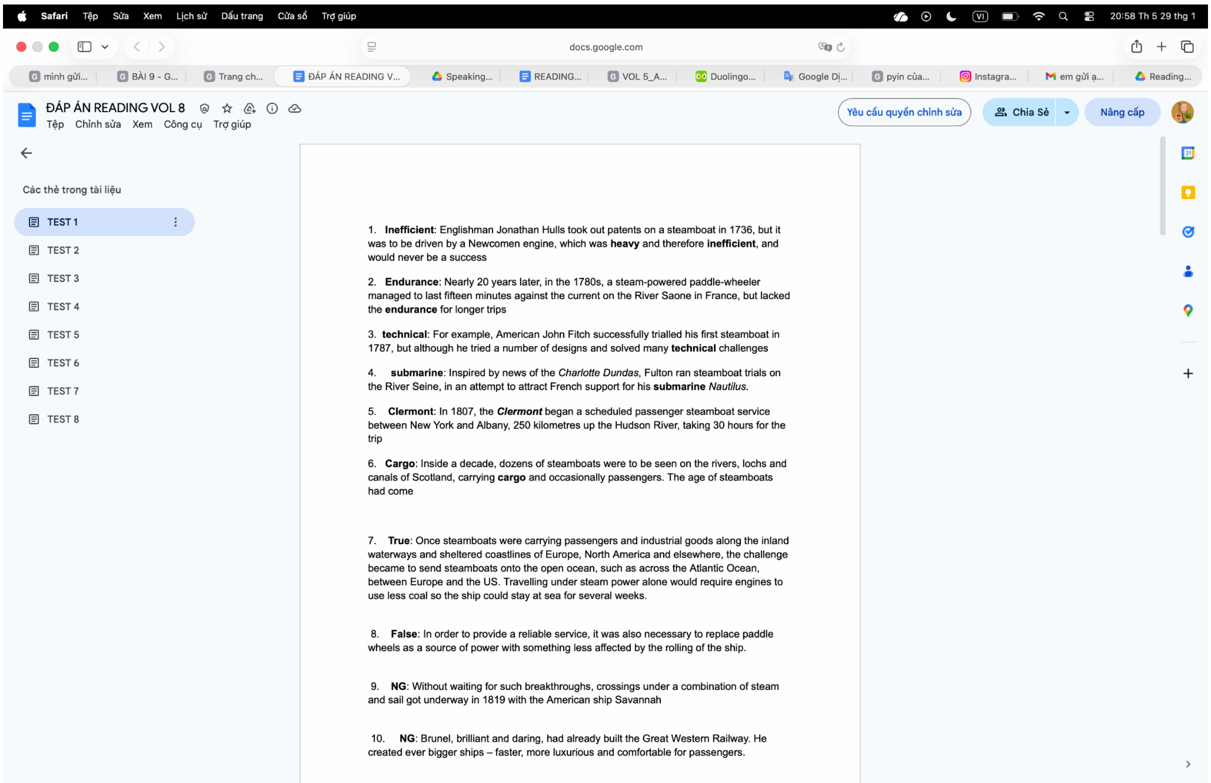


A brain scans
B purpose
C unconscious factors
D questionnaire
E failures
F procedure
G rational decisions
H emotional reaction
I achievements

New technology could help retailers sell more

Research is providing insights into what makes people purchase particular products. Most shoppers believe that their choices are the result of (36)________ . Research involving fMRI scanners, however, has revealed that certain (37)________ influence shoppers' decisions to a significant extent. In the research, a comparison was made between participants' stated opinions of a product and data from (38)________, which often indicated a radically different (39)________. As most new products are (40)________, this data could be extremely valuable for marketing departments.

key.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1. **Inefficient**: Englishman Jonathan Hulls took out patents on a steamboat in 1736, but it was to be driven by a Newcomen engine, which was **heavy** and therefore **inefficient**, and would never be a success

2. **Endurance**: Nearly 20 years later, in the 1780s, a steam-powered paddle-wheeler managed to last fifteen minutes against the current on the River Saone in France, but lacked the **endurance** for longer trips

3. **technical**: For example, American John Fitch successfully trialled his first steamboat in 1787, but although he tried a number of designs and solved many **technical** challenges

4. **submarine**: Inspired by news of the *Charlotte Dundas*, Fulton ran steamboat trials on the River Seine, in an attempt to attract French support for his **submarine** *Nautilus.*

5. **Clermont**: In 1807, the ***Clermont*** began a scheduled passenger steamboat service between New York and Albany, 250 kilometres up the Hudson River, taking 30 hours for the trip

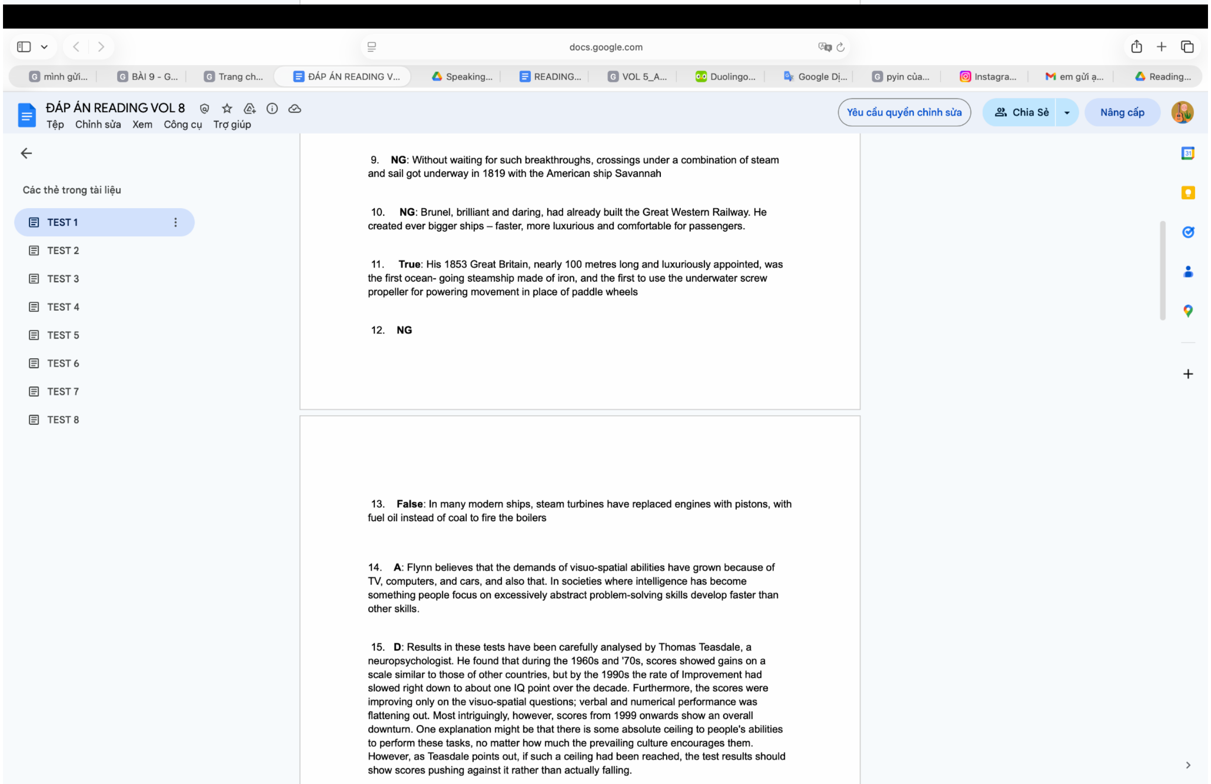
6. **Cargo**: Inside a decade, dozens of steamboats were to be seen on the rivers, lochs and canals of Scotland, carrying **cargo** and occasionally passengers. The age of steamboats had come

7. **True**: Once steamboats were carrying passengers and industrial goods along the inland waterways and sheltered coastlines of Europe, North America and elsewhere, the challenge became to send steamboats onto the open ocean, such as across the Atlantic Ocean, between Europe and the US. Travelling under steam power alone would require engines to use less coal so the ship could stay at sea for several weeks.

8. **False**: In order to provide a reliable service, it was also necessary to replace paddle wheels as a source of power with something less affected by the rolling of the ship.

9. **NG**: Without waiting for such breakthroughs, crossings under a combination of steam and sail got underway in 1819 with the American ship Savannah

10. **NG**: Brunel, brilliant and daring, had already built the Great Western Railway. He created ever bigger ships – faster, more luxurious and comfortable for passengers.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9. **NG**: Without waiting for such breakthroughs, crossings under a combination of steam and sail got underway in 1819 with the American ship Savannah

10. **NG**: Brunel, brilliant and daring, had already built the Great Western Railway. He created ever bigger ships – faster, more luxurious and comfortable for passengers.

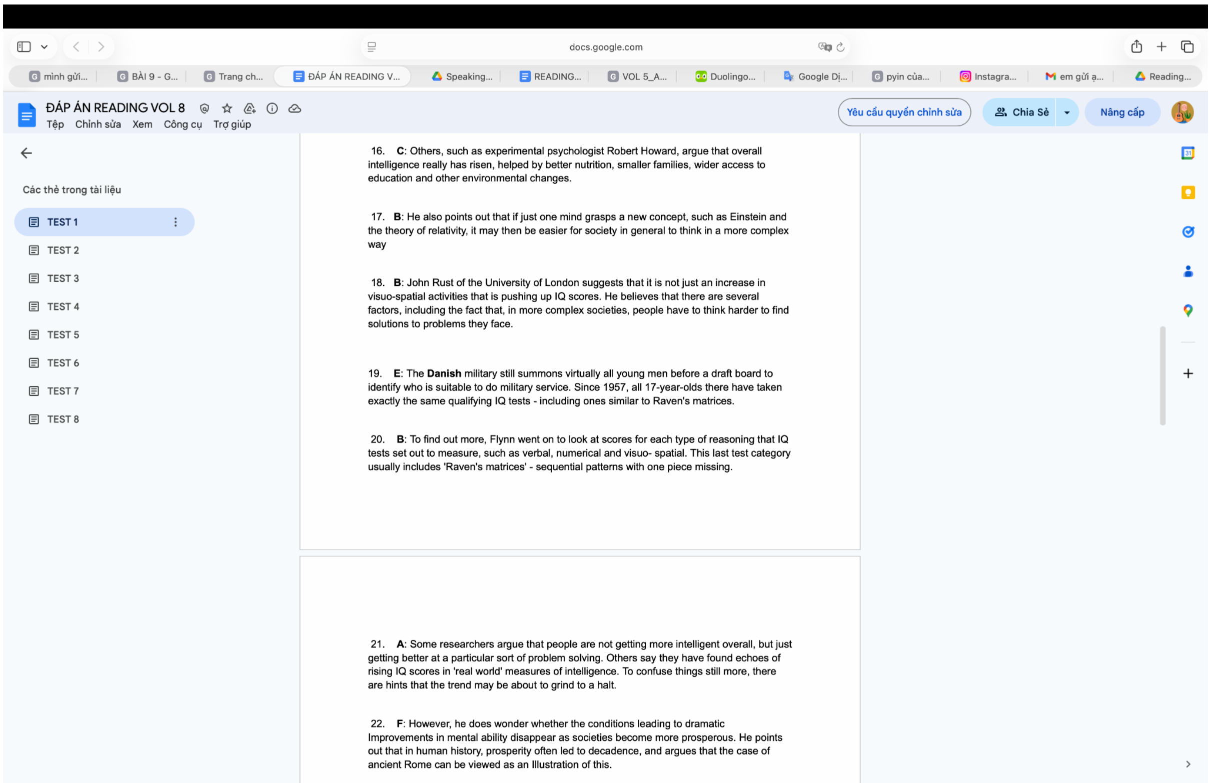
11. **True**: His 1853 Great Britain, nearly 100 metres long and luxuriously appointed, was the first ocean- going steamship made of iron, and the first to use the underwater screw propeller for powering movement in place of paddle wheels

12. **NG**

13. **False**: In many modern ships, steam turbines have replaced engines with pistons, with fuel oil instead of coal to fire the boilers

14. **A**: Flynn believes that the demands of visuo-spatial abilities have grown because of TV, computers, and cars, and also that. In societies where intelligence has become something people focus on excessively abstract problem-solving skills develop faster than other skills.

15. **D**: Results in these tests have been carefully analysed by Thomas Teasdale, a neuropsychologist. He found that during the 1960s and '70s, scores showed gains on a scale similar to those of other countries, but by the 1990s the rate of Improvement had slowed right down to about one IQ point over the decade. Furthermore, the scores were improving only on the visuo-spatial questions; verbal and numerical performance was flattening out. Most intriguingly, however, scores from 1999 onwards show an overall downturn. One explanation might be that there is some absolute ceiling to people's abilities to perform these tasks, no matter how much the prevailing culture encourages them. However, as Teasdale points out, if such a ceiling had been reached, the test results should show scores pushing against it rather than actually falling.



16. **C**: Others, such as experimental psychologist Robert Howard, argue that overall intelligence really has risen, helped by better nutrition, smaller families, wider access to education and other environmental changes.

17. **B**: He also points out that if just one mind grasps a new concept, such as Einstein and the theory of relativity, it may then be easier for society in general to think in a more complex way

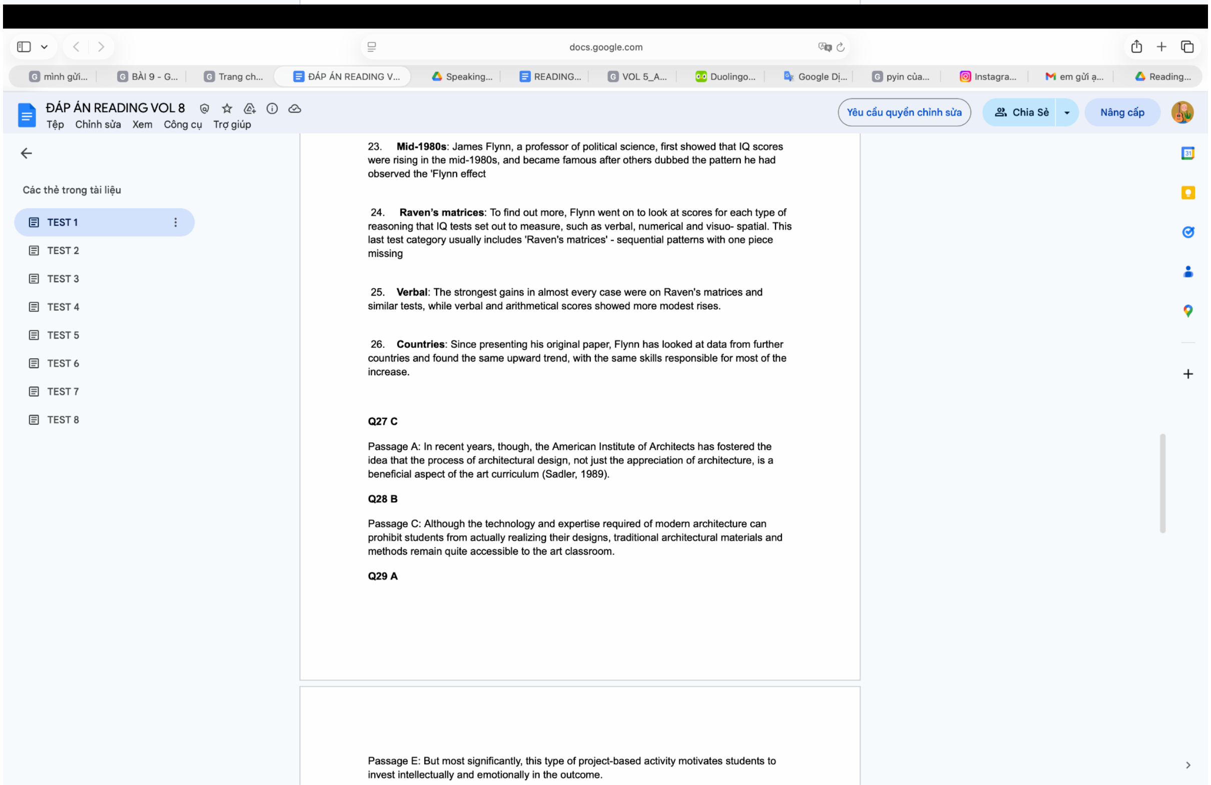
18. **B**: John Rust of the University of London suggests that it is not just an increase in visuo-spatial activities that is pushing up IQ scores. He believes that there are several factors, including the fact that, in more complex societies, people have to think harder to find solutions to problems they face.

19. **E**: The **Danish** military still summons virtually all young men before a draft board to identify who is suitable to do military service. Since 1957, all 17-year-olds there have taken exactly the same qualifying IQ tests - including ones similar to Raven's matrices.

20. **B**: To find out more, Flynn went on to look at scores for each type of reasoning that IQ tests set out to measure, such as verbal, numerical and visuo- spatial. This last test category usually includes 'Raven's matrices' - sequential patterns with one piece missing.

21. **A**: Some researchers argue that people are not getting more intelligent overall, but just getting better at a particular sort of problem solving. Others say they have found echoes of rising IQ scores in 'real world' measures of intelligence. To confuse things still more, there are hints that the trend may be about to grind to a halt.

22. **F**: However, he does wonder whether the conditions leading to dramatic Improvements in mental ability disappear as societies become more prosperous. He points out that in human history, prosperity often led to decadence, and argues that the case of ancient Rome can be viewed as an Illustration of this.



23. **Mid-1980s**: James Flynn, a professor of political science, first showed that IQ scores were rising in the mid-1980s, and became famous after others dubbed the pattern he had observed the 'Flynn effect

24. **Raven's matrices**: To find out more, Flynn went on to look at scores for each type of reasoning that IQ tests set out to measure, such as verbal, numerical and visuo- spatial. This last test category usually includes 'Raven's matrices' - sequential patterns with one piece missing

25. **Verbal**: The strongest gains in almost every case were on Raven's matrices and similar tests, while verbal and arithmetical scores showed more modest rises.

26. **Countries**: Since presenting his original paper, Flynn has looked at data from further countries and found the same upward trend, with the same skills responsible for most of the increase.

Q27 C

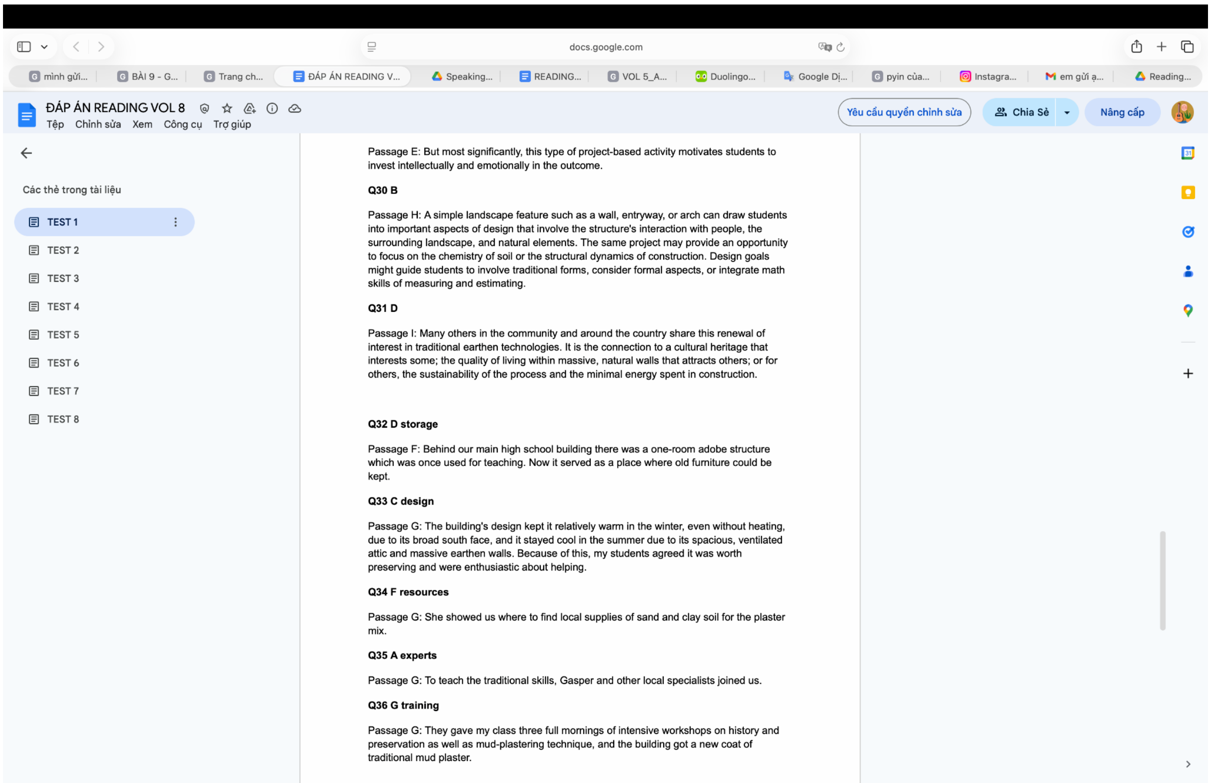
Passage A: In recent years, though, the American Institute of Architects has fostered the idea that the process of architectural design, not just the appreciation of architecture, is a beneficial aspect of the art curriculum (Sadler, 1989).

Q28 B

Passage C: Although the technology and expertise required of modern architecture can prohibit students from actually realizing their designs, traditional architectural materials and methods remain quite accessible to the art classroom.

Q29 A

Passage E: But most significantly, this type of project-based activity motivates students to invest intellectually and emotionally in the outcome.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Passage E: But most significantly, this type of project-based activity motivates students to invest intellectually and emotionally in the outcome.

Q30 B

Passage H: A simple landscape feature such as a wall, entryway, or arch can draw students into important aspects of design that involve the structure's interaction with people, the surrounding landscape, and natural elements. The same project may provide an opportunity to focus on the chemistry of soil or the structural dynamics of construction. Design goals might guide students to involve traditional forms, consider formal aspects, or integrate math skills of measuring and estimating.

Q31 D

Passage I: Many others in the community and around the country share this renewal of interest in traditional earthen technologies. It is the connection to a cultural heritage that interests some; the quality of living within massive, natural walls that attracts others; or for others, the sustainability of the process and the minimal energy spent in construction.

Q32 D storage

Passage F: Behind our main high school building there was a one-room adobe structure which was once used for teaching. Now it served as a place where old furniture could be kept.

Q33 C design

Passage G: The building's design kept it relatively warm in the winter, even without heating, due to its broad south face, and it stayed cool in the summer due to its spacious, ventilated attic and massive earthen walls. Because of this, my students agreed it was worth preserving and were enthusiastic about helping.

Q34 F resources

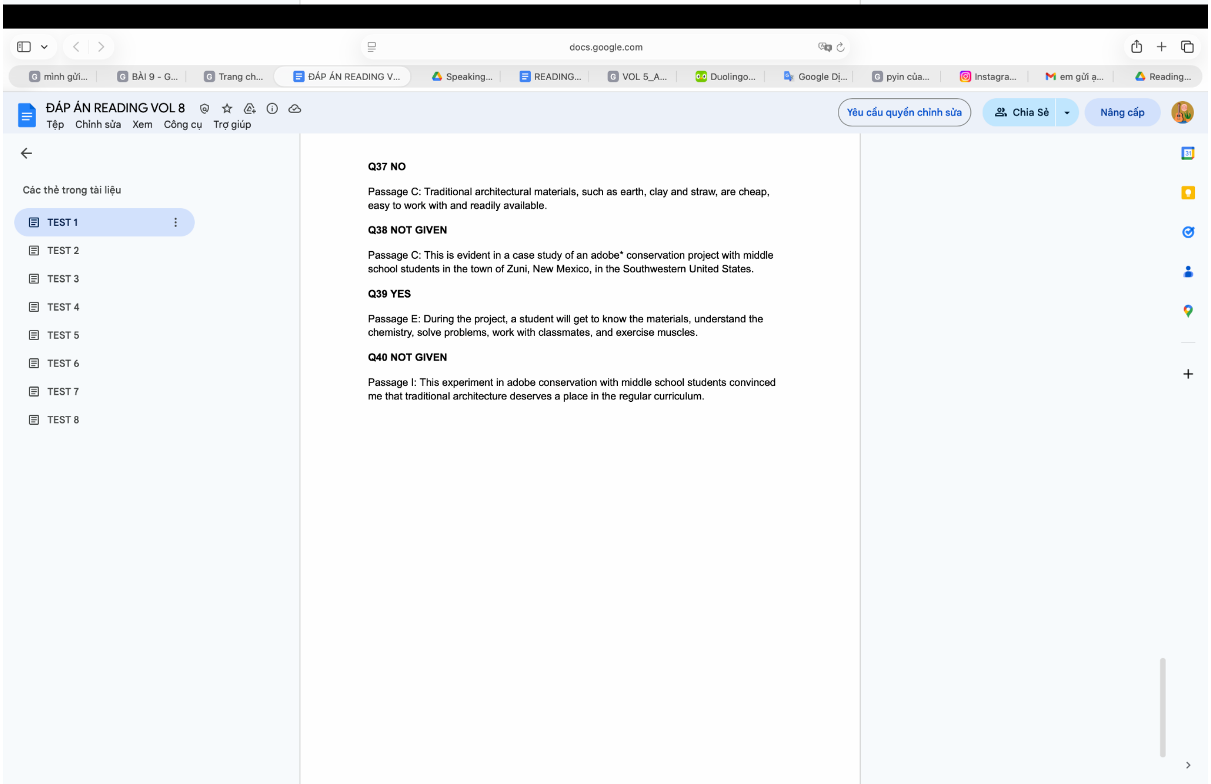
Passage G: She showed us where to find local supplies of sand and clay soil for the plaster mix.

Q35 A experts

Passage G: To teach the traditional skills, Gasper and other local specialists joined us.

Q36 G training

Passage G: They gave my class three full mornings of intensive workshops on history and preservation as well as mud-plastering technique, and the building got a new coat of traditional mud plaster.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Q37 NO

Passage C: Traditional architectural materials, such as earth, clay and straw, are cheap, easy to work with and readily available.

Q38 NOT GIVEN

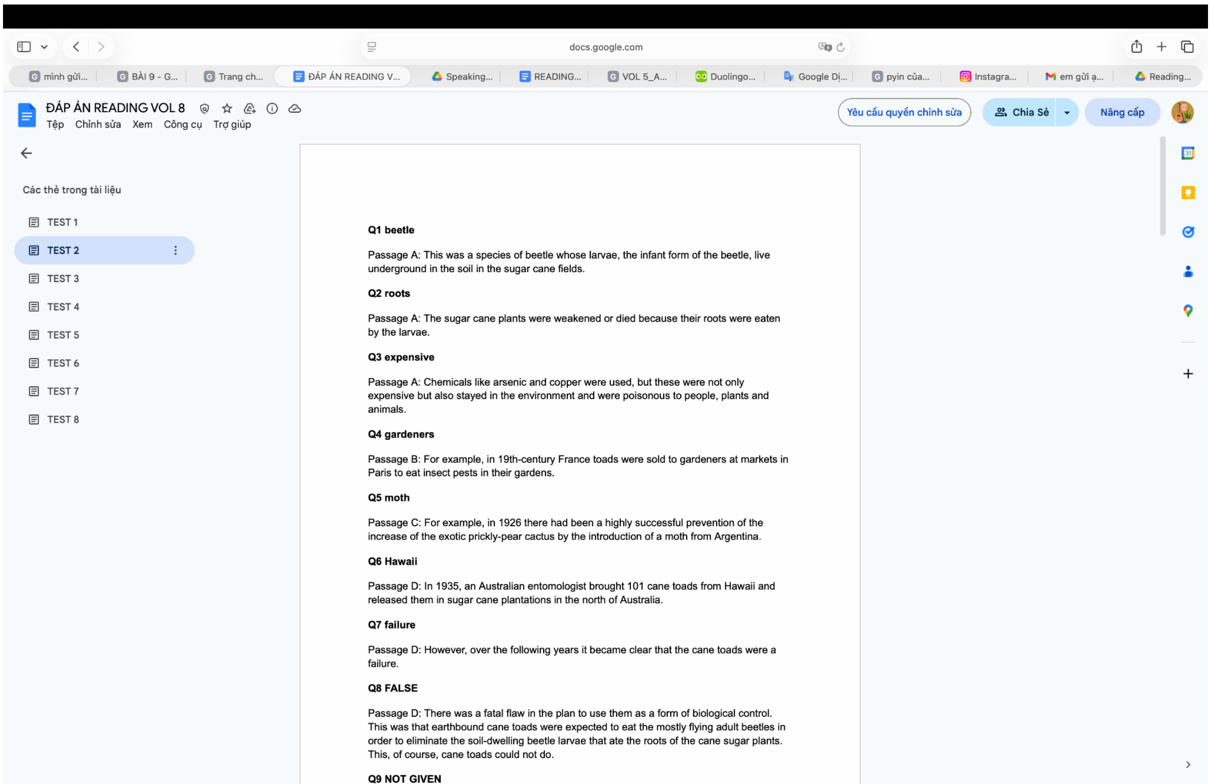
Passage C: This is evident in a case study of an adobe* conservation project with middle school students in the town of Zuni, New Mexico, in the Southwestern United States.

Q39 YES

Passage E: During the project, a student will get to know the materials, understand the chemistry, solve problems, work with classmates, and exercise muscles.

Q40 NOT GIVEN

Passage I: This experiment in adobe conservation with middle school students convinced me that traditional architecture deserves a place in the regular curriculum.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Q1 beetle

Passage A: This was a species of beetle whose larvae, the infant form of the beetle, live underground in the soil in the sugar cane fields.

Q2 roots

Passage A: The sugar cane plants were weakened or died because their roots were eaten by the larvae.

Q3 expensive

Passage A: Chemicals like arsenic and copper were used, but these were not only expensive but also stayed in the environment and were poisonous to people, plants and animals.

Q4 gardeners

Passage B: For example, in 19th-century France toads were sold to gardeners at markets in Paris to eat insect pests in their gardens.

Q5 moth

Passage C: For example, in 1926 there had been a highly successful prevention of the increase of the exotic prickly-pear cactus by the introduction of a moth from Argentina.

Q6 Hawaii

Passage D: In 1935, an Australian entomologist brought 101 cane toads from Hawaii and released them in sugar cane plantations in the north of Australia.

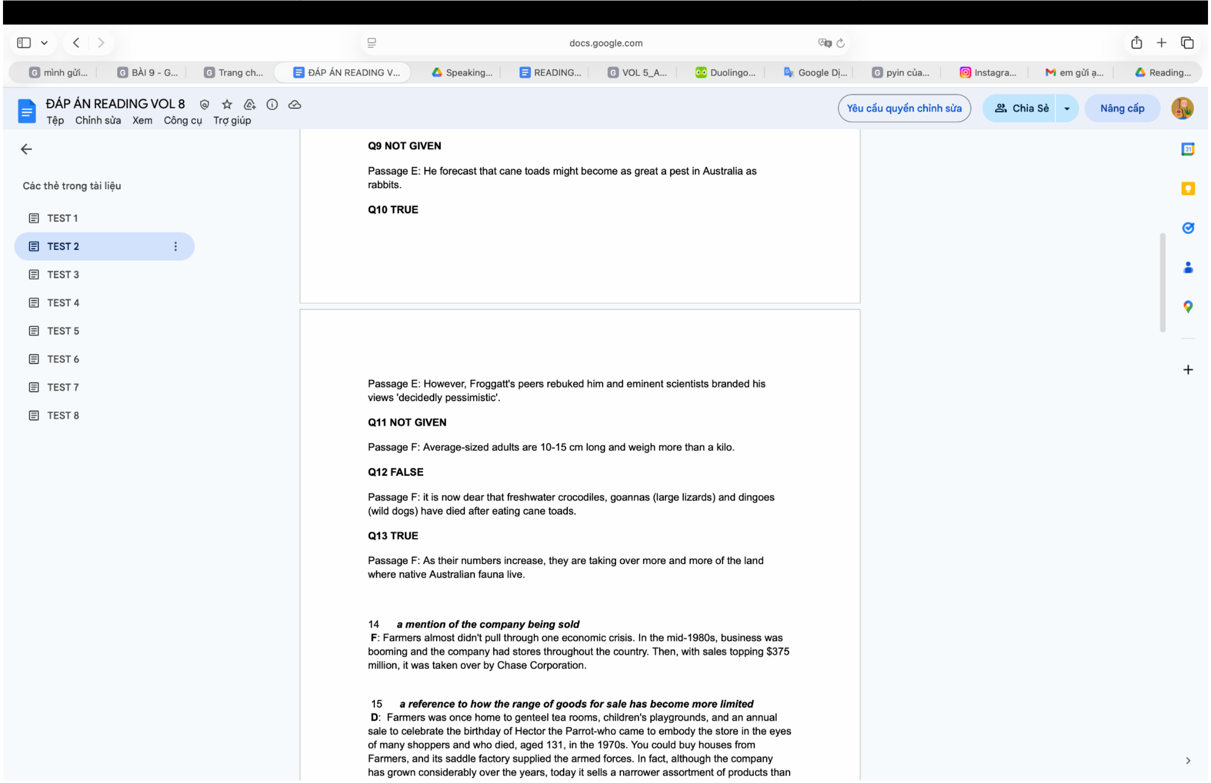
Q7 failure

Passage D: However, over the following years it became clear that the cane toads were a failure.

Q8 FALSE

Passage D: There was a fatal flaw in the plan to use them as a form of biological control. This was that earthbound cane toads were expected to eat the mostly flying adult beetles in order to eliminate the soil-dwelling beetle larvae that ate the roots of the cane sugar plants. This, of course, cane toads could not do.

Q9 NOT GIVEN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Q9 NOT GIVEN

Passage E: He forecast that cane toads might become as great a pest in Australia as rabbits.

Q10 TRUE

Passage E: However, Froggatt's peers rebuked him and eminent scientists branded his views 'decidedly pessimistic'.

Q11 NOT GIVEN

Passage F: Average-sized adults are 10-15 cm long and weigh more than a kilo.

Q12 FALSE

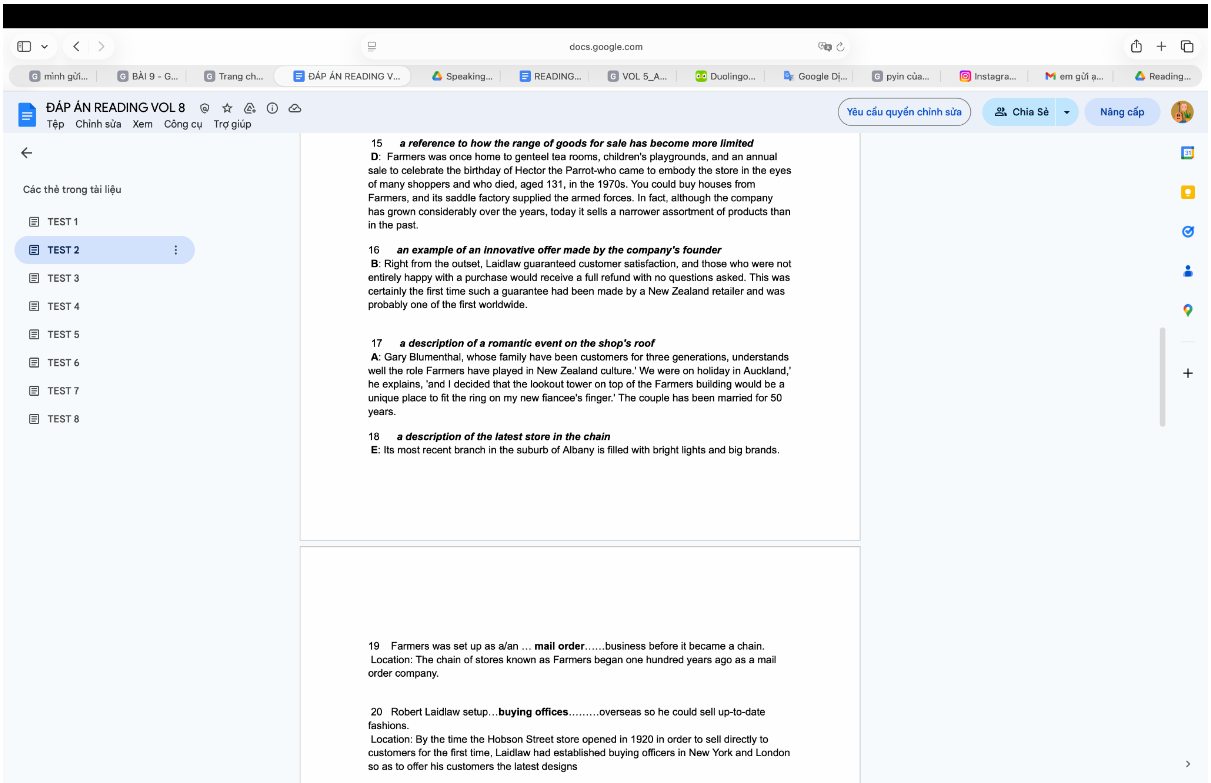
Passage F: it is now dear that freshwater crocodiles, goannas (large lizards) and dingoes (wild dogs) have died after eating cane toads.

Q13 TRUE

Passage F: As their numbers increase, they are taking over more and more of the land where native Australian fauna live.

14 ***a mention of the company being sold***
F: Farmers almost didn't pull through one economic crisis. In the mid-1980s, business was booming and the company had stores throughout the country. Then, with sales topping $375 million, it was taken over by Chase Corporation.

15 ***a reference to how the range of goods for sale has become more limited***
D: Farmers was once home to genteel tea rooms, children's playgrounds, and an annual sale to celebrate the birthday of Hector the Parrot-who came to embody the store in the eyes of many shoppers and who died, aged 131, in the 1970s. You could buy houses from Farmers, and its saddle factory supplied the armed forces. In fact, although the company has grown considerably over the years, today it sells a narrower assortment of products than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15 ***a reference to how the range of goods for sale has become more limited***

D: Farmers was once home to genteel tea rooms, children's playgrounds, and an annual sale to celebrate the birthday of Hector the Parrot-who came to embody the store in the eyes of many shoppers and who died, aged 131, in the 1970s. You could buy houses from Farmers, and its saddle factory supplied the armed forces. In fact, although the company has grown considerably over the years, today it sells a narrower assortment of products than in the past.

16 ***an example of an innovative offer made by the company's founder***

B: Right from the outset, Laidlaw guaranteed customer satisfaction, and those who were not entirely happy with a purchase would receive a full refund with no questions asked. This was certainly the first time such a guarantee had been made by a New Zealand retailer and was probably one of the first worldwide.

17 ***a description of a romantic event on the shop's roof***

A: Gary Blumenthal, whose family have been customers for three generations, understands well the role Farmers have played in New Zealand culture.' We were on holiday in Auckland,' he explains, 'and I decided that the lookout tower on top of the Farmers building would be a unique place to fit the ring on my new fiancee's finger.' The couple has been married for 50 years.

18 ***a description of the latest store in the chain***

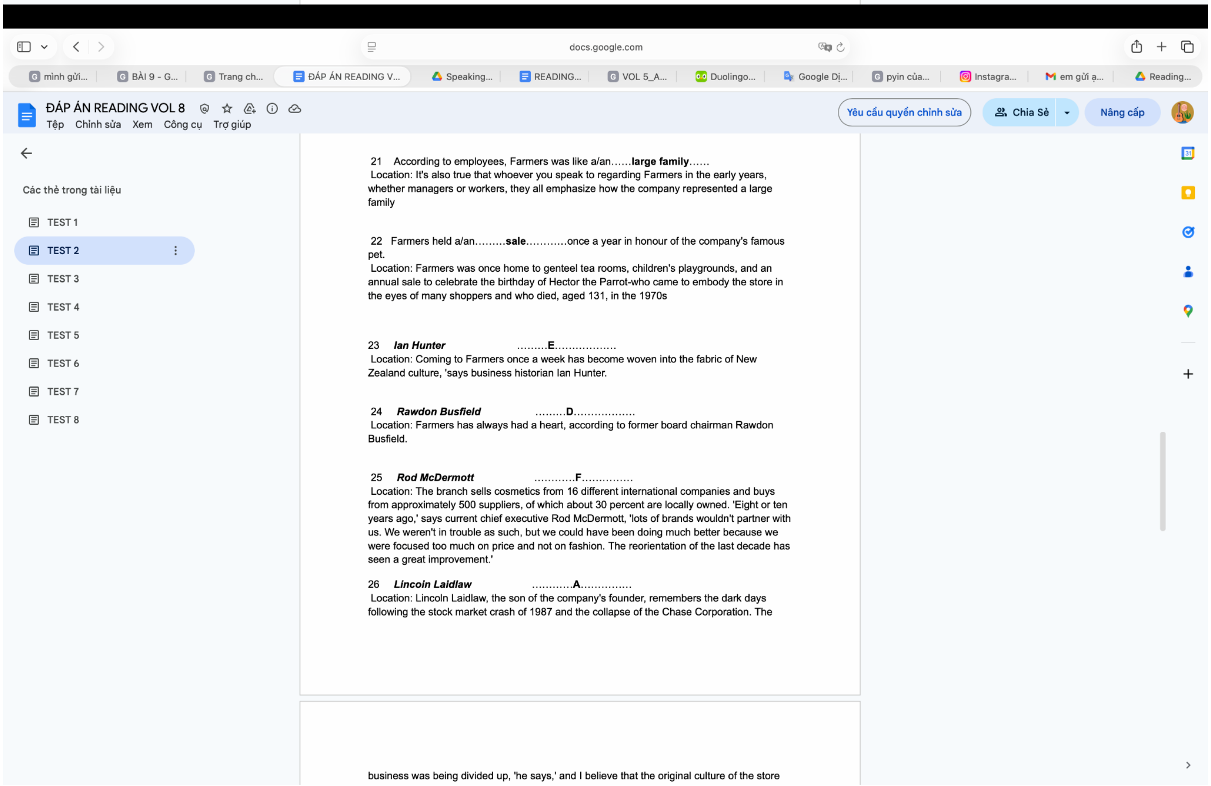
E: Its most recent branch in the suburb of Albany is filled with bright lights and big brands.

19 Farmers was set up as a/an … **mail order**……business before it became a chain.

Location: The chain of stores known as Farmers began one hundred years ago as a mail order company.

20 Robert Laidlaw setup…**buying offices**………overseas so he could sell up-to-date fashions.

Location: By the time the Hobson Street store opened in 1920 in order to sell directly to customers for the first time, Laidlaw had established buying officers in New York and London so as to offer his customers the latest designs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21 According to employees, Farmers was like a/an……**large family**……

Location: It's also true that whoever you speak to regarding Farmers in the early years, whether managers or workers, they all emphasize how the company represented a large family

22 Farmers held a/an………**sale**…………once a year in honour of the company's famous pet.

Location: Farmers was once home to genteel tea rooms, children's playgrounds, and an annual sale to celebrate the birthday of Hector the Parrot-who came to embody the store in the eyes of many shoppers and who died, aged 131, in the 1970s

23 ***Ian Hunter*** ………**E**………………

Location: Coming to Farmers once a week has become woven into the fabric of New Zealand culture, 'says business historian Ian Hunter.

24 ***Rawdon Busfield*** ………**D**………………

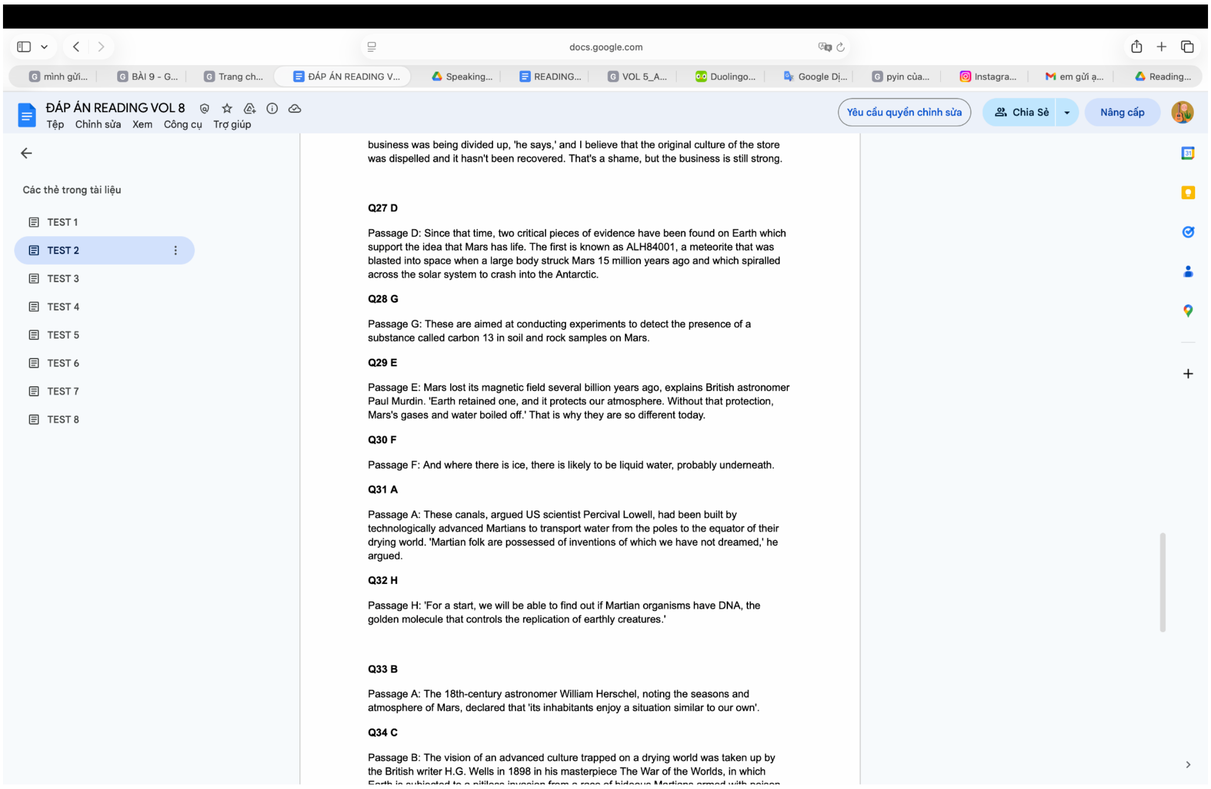
Location: Farmers has always had a heart, according to former board chairman Rawdon Busfield.

25 ***Rod McDermott*** …………**F**……………

Location: The branch sells cosmetics from 16 different international companies and buys from approximately 500 suppliers, of which about 30 percent are locally owned. 'Eight or ten years ago,' says current chief executive Rod McDermott, 'lots of brands wouldn't partner with us. We weren't in trouble as such, but we could have been doing much better because we were focused too much on price and not on fashion. The reorientation of the last decade has seen a great improvement.'

26 ***Lincoin Laidlaw*** …………**A**……………

Location: Lincoln Laidlaw, the son of the company's founder, remembers the dark days following the stock market crash of 1987 and the collapse of the Chase Corporation. The business was being divided up, 'he says,' and I believe that the original culture of the store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business was being divided up, 'he says,' and I believe that the original culture of the store was dispelled and it hasn't been recovered. That's a shame, but the business is still strong.

Q27 D

Passage D: Since that time, two critical pieces of evidence have been found on Earth which support the idea that Mars has life. The first is known as ALH84001, a meteorite that was blasted into space when a large body struck Mars 15 million years ago and which spiralled across the solar system to crash into the Antarctic.

Q28 G

Passage G: These are aimed at conducting experiments to detect the presence of a substance called carbon 13 in soil and rock samples on Mars.

Q29 E

Passage E: Mars lost its magnetic field several billion years ago, explains British astronomer Paul Murdin. 'Earth retained one, and it protects our atmosphere. Without that protection, Mars's gases and water boiled off.' That is why they are so different today.

Q30 F

Passage F: And where there is ice, there is likely to be liquid water, probably underneath.

Q31 A

Passage A: These canals, argued US scientist Percival Lowell, had been built by technologically advanced Martians to transport water from the poles to the equator of their drying world. 'Martian folk are possessed of inventions of which we have not dreamed,' he argued.

Q32 H

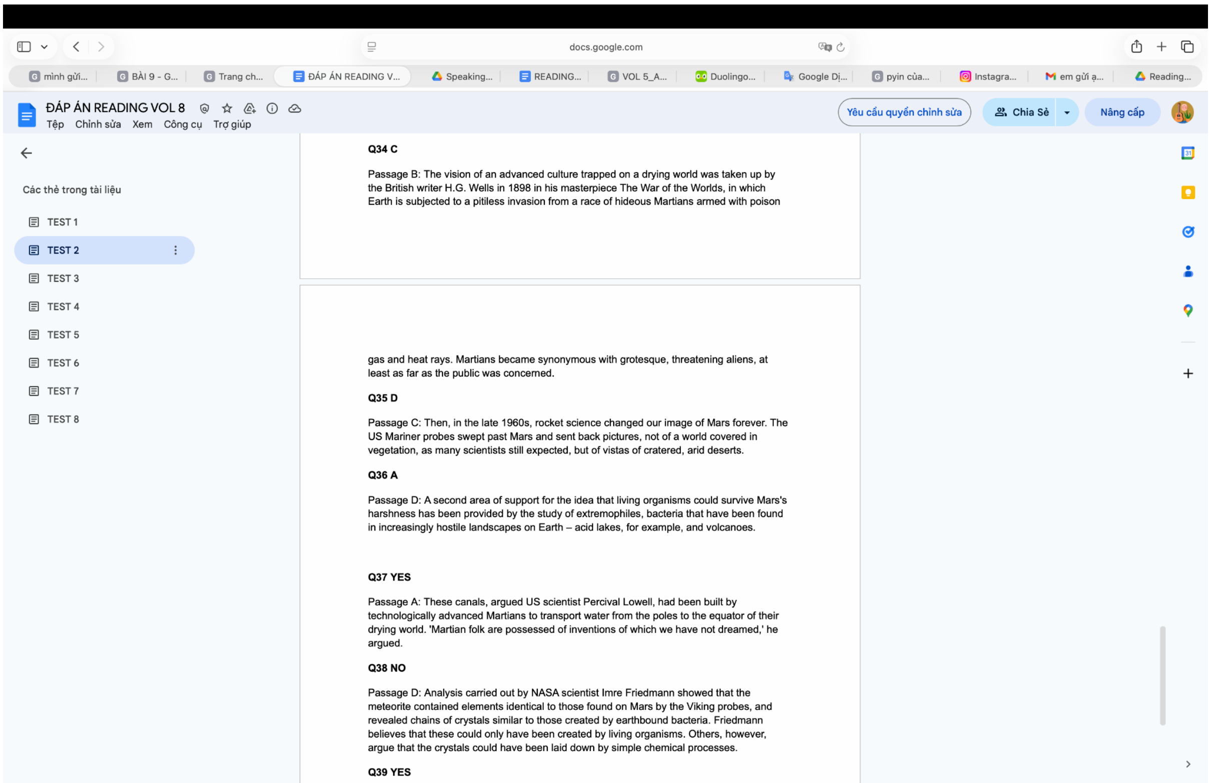
Passage H: 'For a start, we will be able to find out if Martian organisms have DNA, the golden molecule that controls the replication of earthly creatures.'

Q33 B

Passage A: The 18th-century astronomer William Herschel, noting the seasons and atmosphere of Mars, declared that 'its inhabitants enjoy a situation similar to our own'.

Q34 C

Passage B: The vision of an advanced culture trapped on a drying world was taken up by the British writer H.G. Wells in 1898 in his masterpiece The War of the Worlds, in which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Q34 C

Passage B: The vision of an advanced culture trapped on a drying world was taken up by the British writer H.G. Wells in 1898 in his masterpiece The War of the Worlds, in which Earth is subjected to a pitiless invasion from a race of hideous Martians armed with poison gas and heat rays. Martians became synonymous with grotesque, threatening aliens, at least as far as the public was concerned.

Q35 D

Passage C: Then, in the late 1960s, rocket science changed our image of Mars forever. The US Mariner probes swept past Mars and sent back pictures, not of a world covered in vegetation, as many scientists still expected, but of vistas of cratered, arid deserts.

Q36 A

Passage D: A second area of support for the idea that living organisms could survive Mars's harshness has been provided by the study of extremophiles, bacteria that have been found in increasingly hostile landscapes on Earth – acid lakes, for example, and volcanoes.

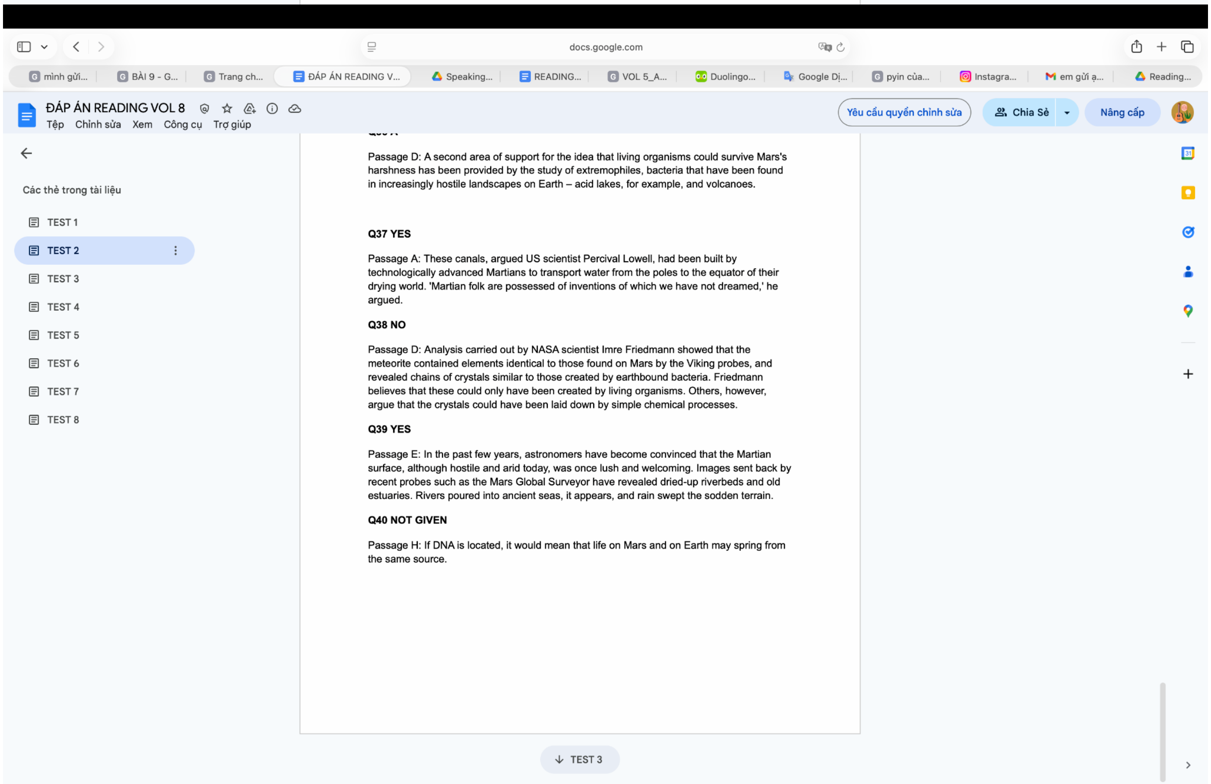
Q37 YES

Passage A: These canals, argued US scientist Percival Lowell, had been built by technologically advanced Martians to transport water from the poles to the equator of their drying world. 'Martian folk are possessed of inventions of which we have not dreamed,' he argued.

Q38 NO

Passage D: Analysis carried out by NASA scientist Imre Friedmann showed that the meteorite contained elements identical to those found on Mars by the Viking probes, and revealed chains of crystals similar to those created by earthbound bacteria. Friedmann believes that these could only have been created by living organisms. Others, however, argue that the crystals could have been laid down by simple chemical processes.

Q39 YES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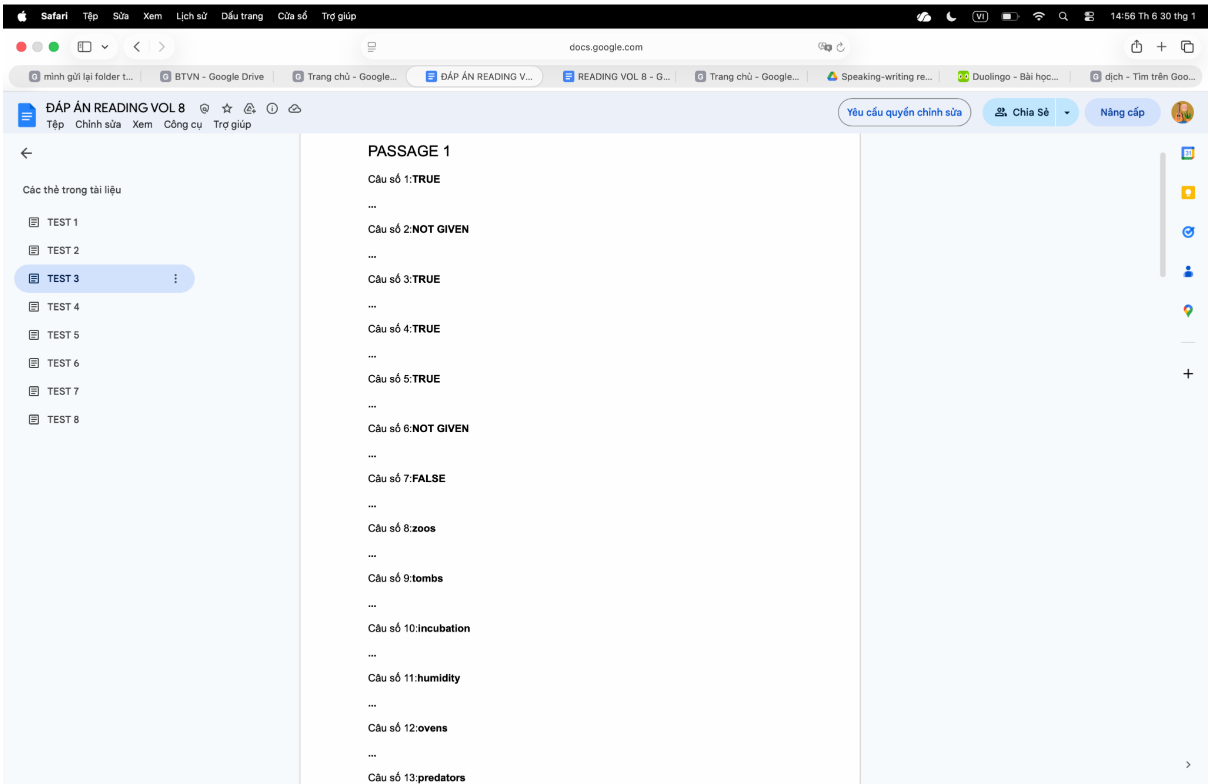
Q39 YES

Passage E: In the past few years, astronomers have become convinced that the Martian surface, although hostile and arid today, was once lush and welcoming. Images sent back by recent probes such as the Mars Global Surveyor have revealed dried-up riverbeds and old estuaries. Rivers poured into ancient seas, it appears, and rain swept the sodden terrain.

Q40 NOT GIVEN

Passage H: If DNA is located, it would mean that life on Mars and on Earth may spring from the same source.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PASSAGE 1

Câu số 1:**TRUE**

...

Câu số 2:**NOT GIVEN**

...

Câu số 3:**TRUE**

...

Câu số 4:**TRUE**

...

Câu số 5:**TRUE**

...

Câu số 6:**NOT GIVEN**

...

Câu số 7:**FALSE**

...

Câu số 8:**zoos**

...

Câu số 9:**tombs**

...

Câu số 10:**incubation**

...

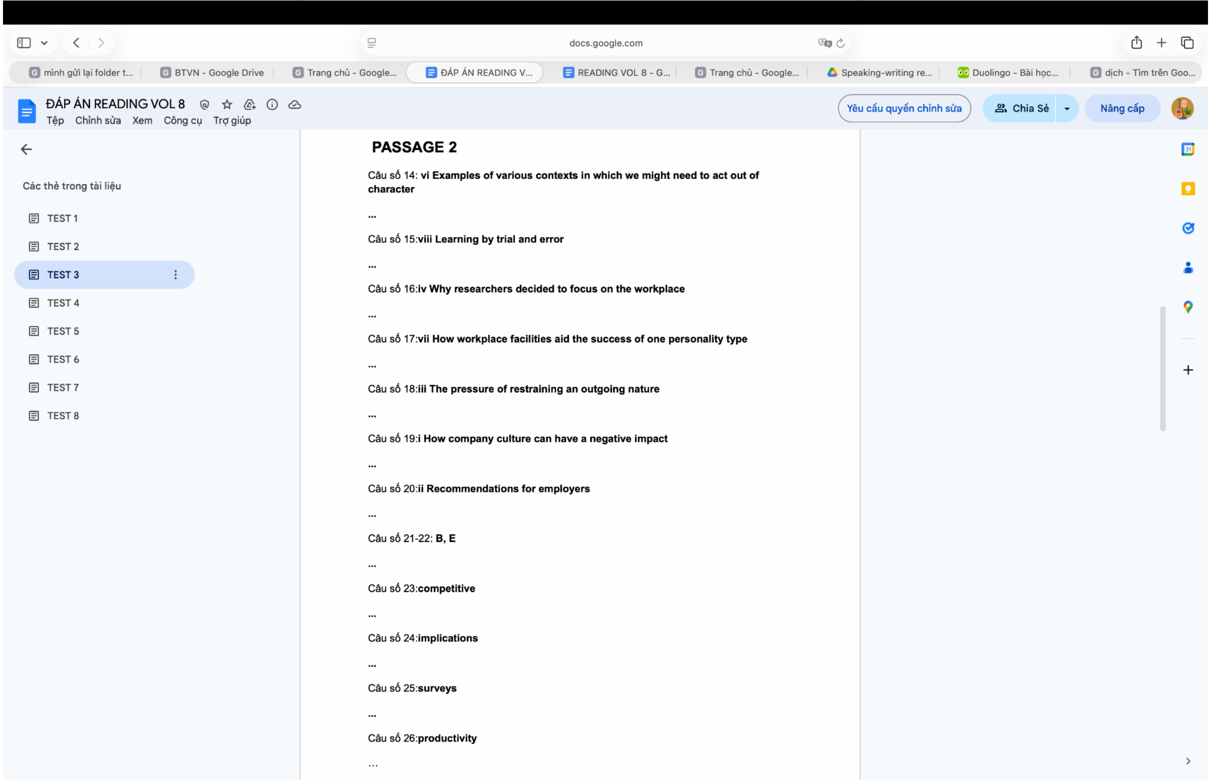
Câu số 11:**humidity**

...

Câu số 12:**ovens**

...

Câu số 13:**predators**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PASSAGE 2

Câu số 14: **vi Examples of various contexts in which we might need to act out of character**

...

Câu số 15:**viii Learning by trial and error**

...

Câu số 16:**iv Why researchers decided to focus on the workplace**

...

Câu số 17:**vii How workplace facilities aid the success of one personality type**

...

Câu số 18:**iii The pressure of restraining an outgoing nature**

...

Câu số 19:**i How company culture can have a negative impact**

...

Câu số 20:**ii Recommendations for employers**

...

Câu số 21-22: **B, E**

...

Câu số 23:**competitive**

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Câu số 24:**implications**

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Câu số 25:**surveys**

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Câu số 26:**productivity**

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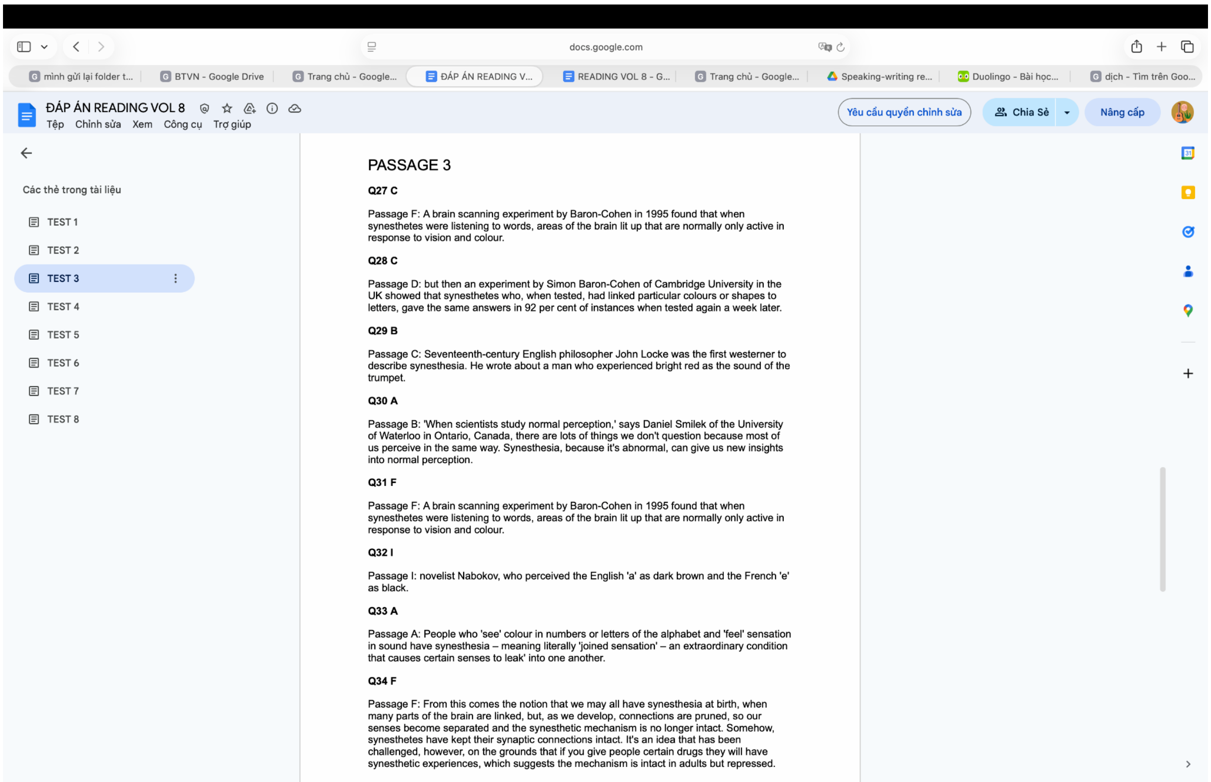
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PASSAGE 3

Q27 C

Passage F: A brain scanning experiment by Baron-Cohen in 1995 found that when synesthetes were listening to words, areas of the brain lit up that are normally only active in response to vision and colour.

Q28 C

Passage D: but then an experiment by Simon Baron-Cohen of Cambridge University in the UK showed that synesthetes who, when tested, had linked particular colours or shapes to letters, gave the same answers in 92 per cent of instances when tested again a week later.

Q29 B

Passage C: Seventeenth-century English philosopher John Locke was the first westerner to describe synesthesia. He wrote about a man who experienced bright red as the sound of the trumpet.

Q30 A

Passage B: 'When scientists study normal perception,' says Daniel Smilek of the University of Waterloo in Ontario, Canada, there are lots of things we don't question because most of us perceive in the same way. Synesthesia, because it's abnormal, can give us new insights into normal perception.

Q31 F

Passage F: A brain scanning experiment by Baron-Cohen in 1995 found that when synesthetes were listening to words, areas of the brain lit up that are normally only active in response to vision and colour.

Q32 I

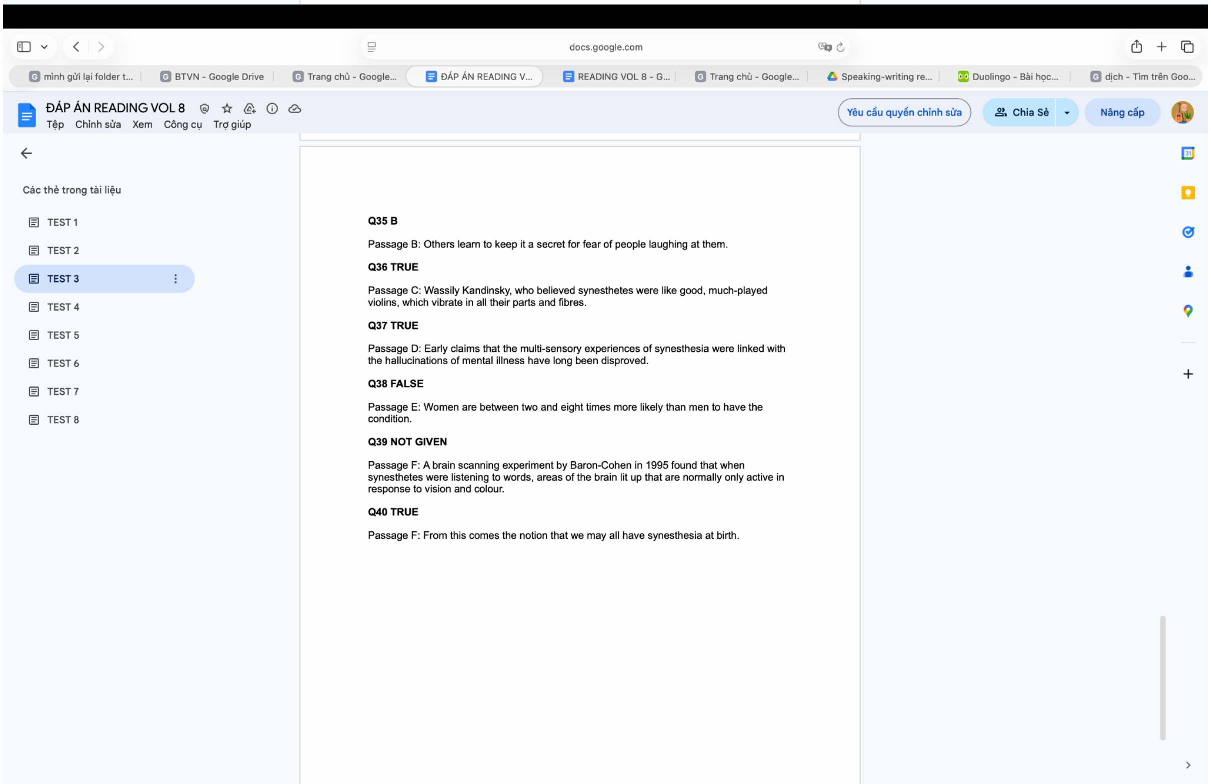
Passage I: novelist Nabokov, who perceived the English 'a' as dark brown and the French 'e' as black.

Q33 A

Passage A: People who 'see' colour in numbers or letters of the alphabet and 'feel' sensation in sound have synesthesia – meaning literally 'joined sensation' – an extraordinary condition that causes certain senses to leak' into one another.

Q34 F

Passage F: From this comes the notion that we may all have synesthesia at birth, when many parts of the brain are linked, but, as we develop, connections are pruned, so our senses become separated and the synesthetic mechanism is no longer intact. Somehow, synesthetes have kept their synaptic connections intact. It's an idea that has been challenged, however, on the grounds that if you give people certain drugs they will have synesthetic experiences, which suggests the mechanism is intact in adults but repressed.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Q35 B

Passage B: Others learn to keep it a secret for fear of people laughing at them.

Q36 TRUE

Passage C: Wassily Kandinsky, who believed synesthetes were like good, much-played violins, which vibrate in all their parts and fibres.

Q37 TRUE

Passage D: Early claims that the multi-sensory experiences of synesthesia were linked with the hallucinations of mental illness have long been disproved.

Q38 FALSE

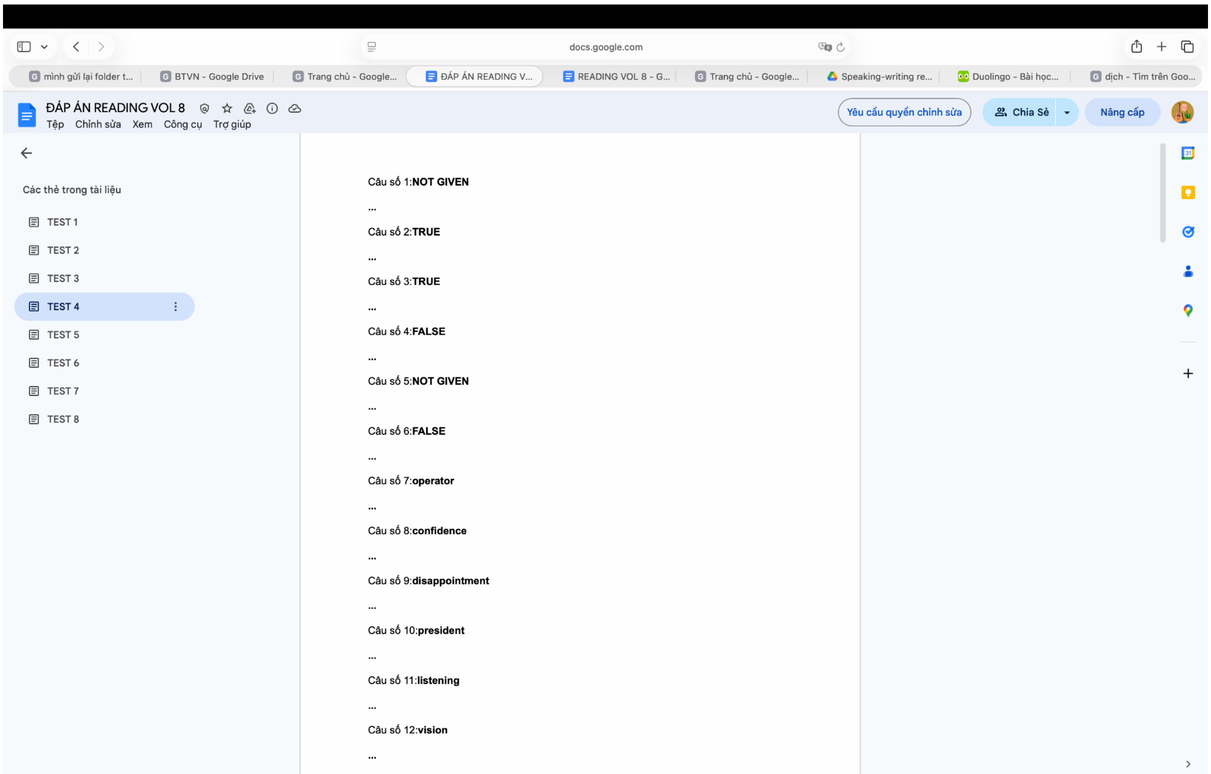
Passage E: Women are between two and eight times more likely than men to have the condition.

Q39 NOT GIVEN

Passage F: A brain scanning experiment by Baron-Cohen in 1995 found that when synesthetes were listening to words, areas of the brain lit up that are normally only active in response to vision and colour.

Q40 TRUE

Passage F: From this comes the notion that we may all have synesthesia at birth.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Câu số 1:**NOT GIVEN**

...

Câu số 2:**TRUE**

...

Câu số 3:**TRUE**

...

Câu số 4:**FALSE**

...

Câu số 5:**NOT GIVEN**

...

Câu số 6:**FALSE**

...

Câu số 7:**operator**

...

Câu số 8:**confidence**

...

Câu số 9:**disappointment**

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Câu số 10:**president**

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Câu số 11:**listening**

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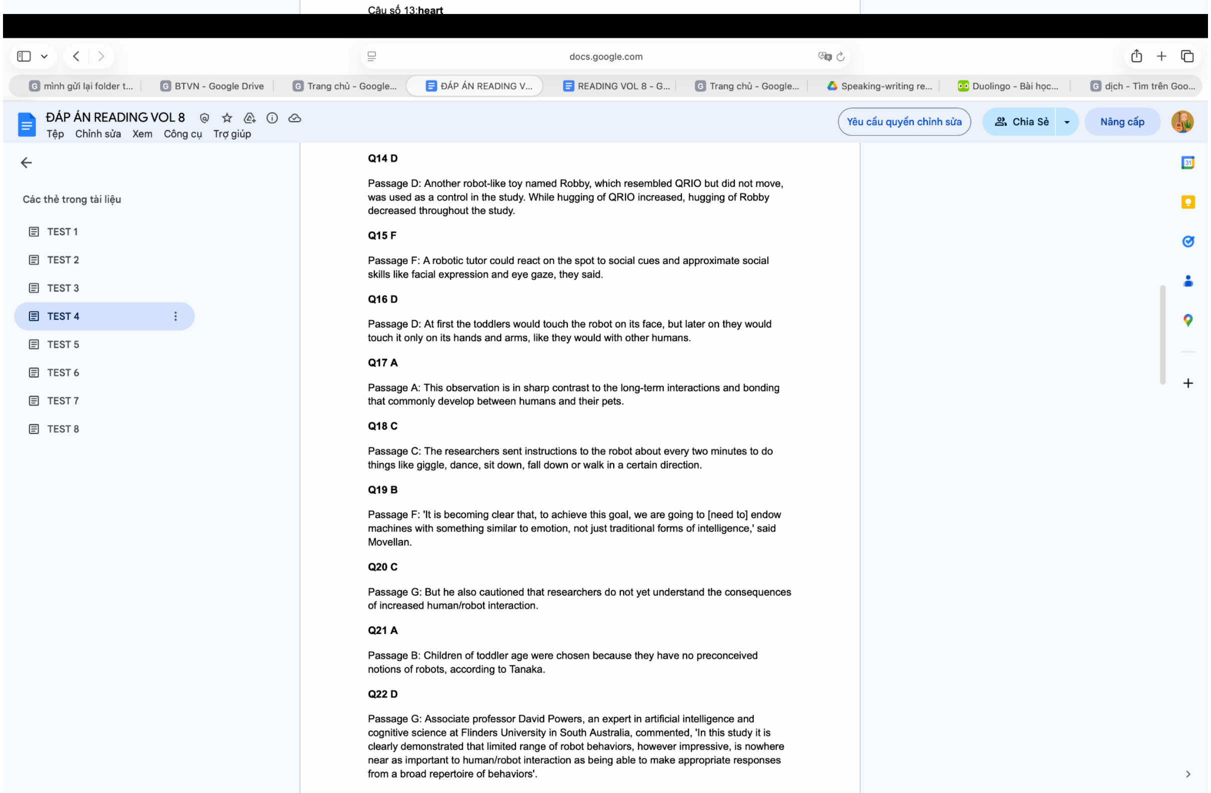
Câu số 12:**vision**

...

Câu số 13:**heart**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Q14 D

Passage D: Another robot-like toy named Robby, which resembled QRIO but did not move, was used as a control in the study. While hugging of QRIO increased, hugging of Robby decreased throughout the study.

Q15 F

Passage F: A robotic tutor could react on the spot to social cues and approximate social skills like facial expression and eye gaze, they said.

Q16 D

Passage D: At first the toddlers would touch the robot on its face, but later on they would touch it only on its hands and arms, like they would with other humans.

Q17 A

Passage A: This observation is in sharp contrast to the long-term interactions and bonding that commonly develop between humans and their pets.

Q18 C

Passage C: The researchers sent instructions to the robot about every two minutes to do things like giggle, dance, sit down, fall down or walk in a certain direction.

Q19 B

Passage F: 'It is becoming clear that, to achieve this goal, we are going to [need to] endow machines with something similar to emotion, not just traditional forms of intelligence,' said Movellan.

Q20 C

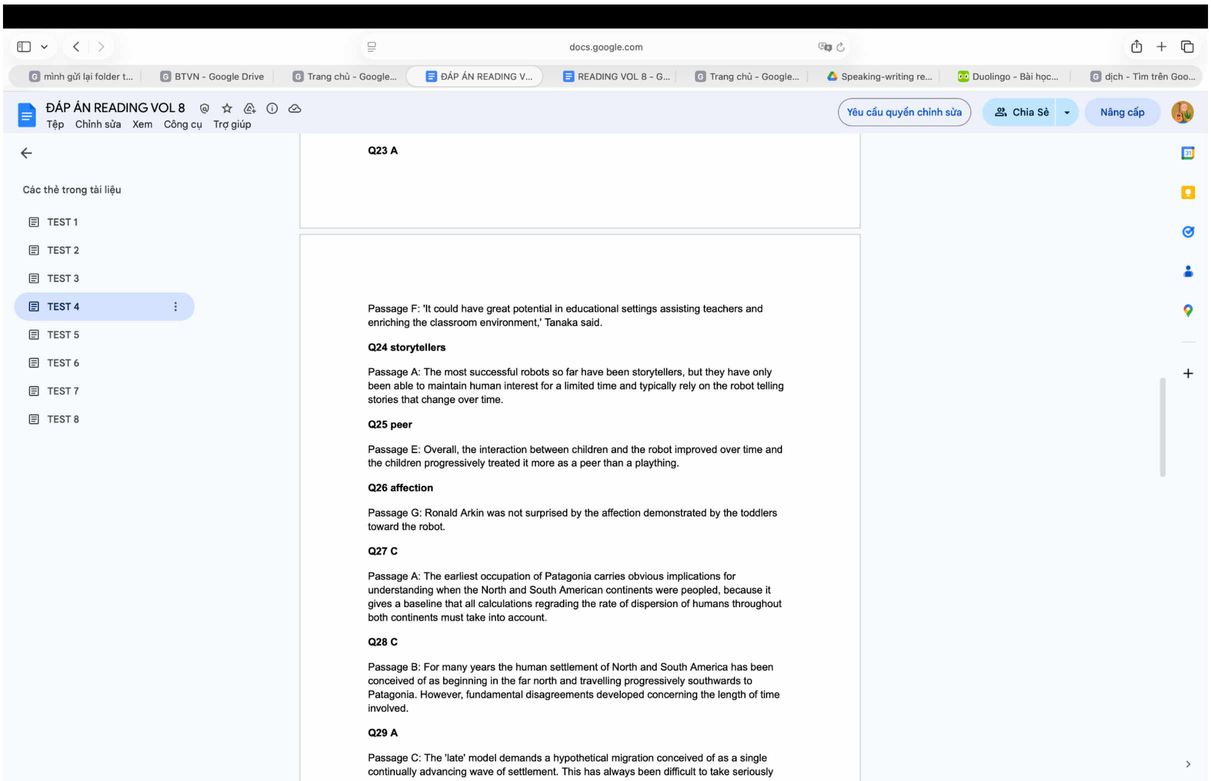
Passage G: But he also cautioned that researchers do not yet understand the consequences of increased human/robot interaction.

Q21 A

Passage B: Children of toddler age were chosen because they have no preconceived notions of robots, according to Tanaka.

Q22 D

Passage G: Associate professor David Powers, an expert in artificial intelligence and cognitive science at Flinders University in South Australia, commented, 'In this study it is clearly demonstrated that limited range of robot behaviors, however impressive, is nowhere near as important to human/robot interaction as being able to make appropriate responses from a broad repertoire of behaviors'.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Q23 A

Passage F: 'It could have great potential in educational settings assisting teachers and enriching the classroom environment,' Tanaka said.

Q24 storytellers

Passage A: The most successful robots so far have been storytellers, but they have only been able to maintain human interest for a limited time and typically rely on the robot telling stories that change over time.

Q25 peer

Passage E: Overall, the interaction between children and the robot improved over time and the children progressively treated it more as a peer than a plaything.

Q26 affection

Passage G: Ronald Arkin was not surprised by the affection demonstrated by the toddlers toward the robot.

Q27 C

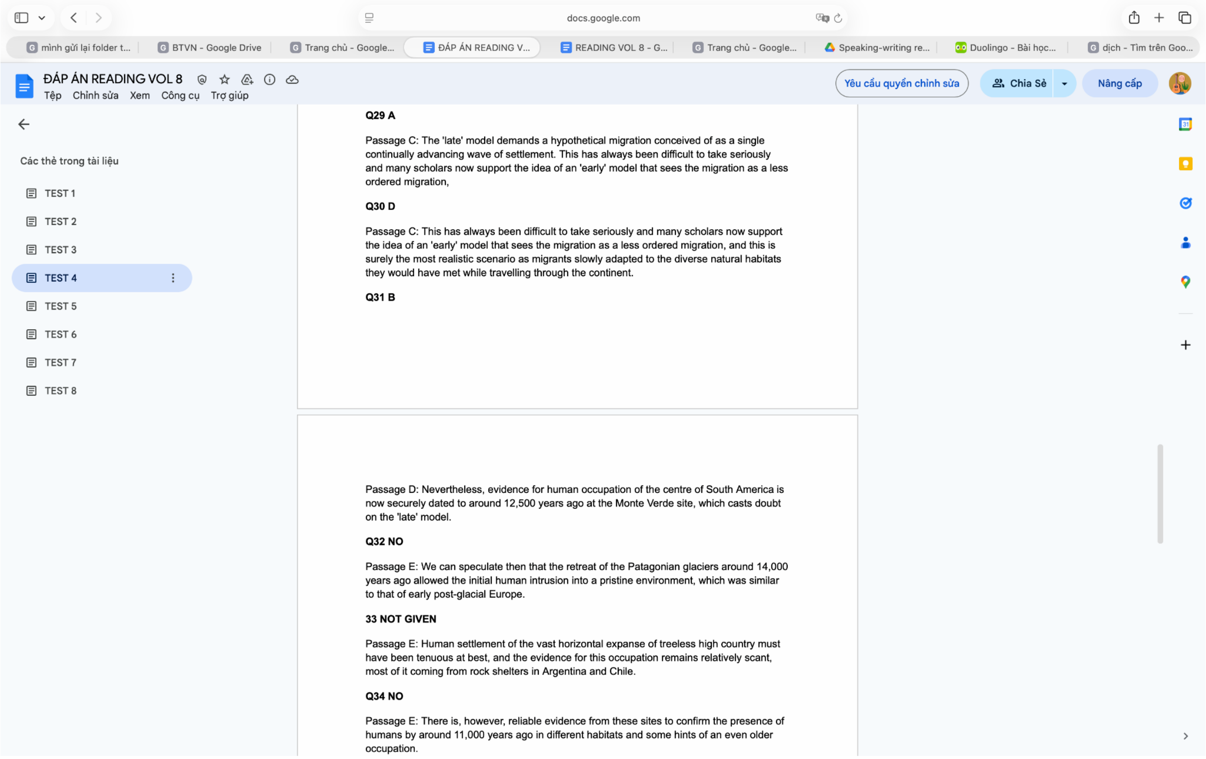
Passage A: The earliest occupation of Patagonia carries obvious implications for understanding when the North and South American continents were peopled, because it gives a baseline that all calculations regrading the rate of dispersion of humans throughout both continents must take into account.

Q28 C

Passage B: For many years the human settlement of North and South America has been conceived of as beginning in the far north and travelling progressively southwards to Patagonia. However, fundamental disagreements developed concerning the length of time involved.

Q29 A

Passage C: The 'late' model demands a hypothetical migration conceived of as a single continually advancing wave of settlement. This has always been difficult to take seriously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Q29 A

Passage C: The 'late' model demands a hypothetical migration conceived of as a single continually advancing wave of settlement. This has always been difficult to take seriously and many scholars now support the idea of an 'early' model that sees the migration as a less ordered migration,

Q30 D

Passage C: This has always been difficult to take seriously and many scholars now support the idea of an 'early' model that sees the migration as a less ordered migration, and this is surely the most realistic scenario as migrants slowly adapted to the diverse natural habitats they would have met while travelling through the continent.

Q31 B

Passage D: Nevertheless, evidence for human occupation of the centre of South America is now securely dated to around 12,500 years ago at the Monte Verde site, which casts doubt on the 'late' model.

Q32 NO

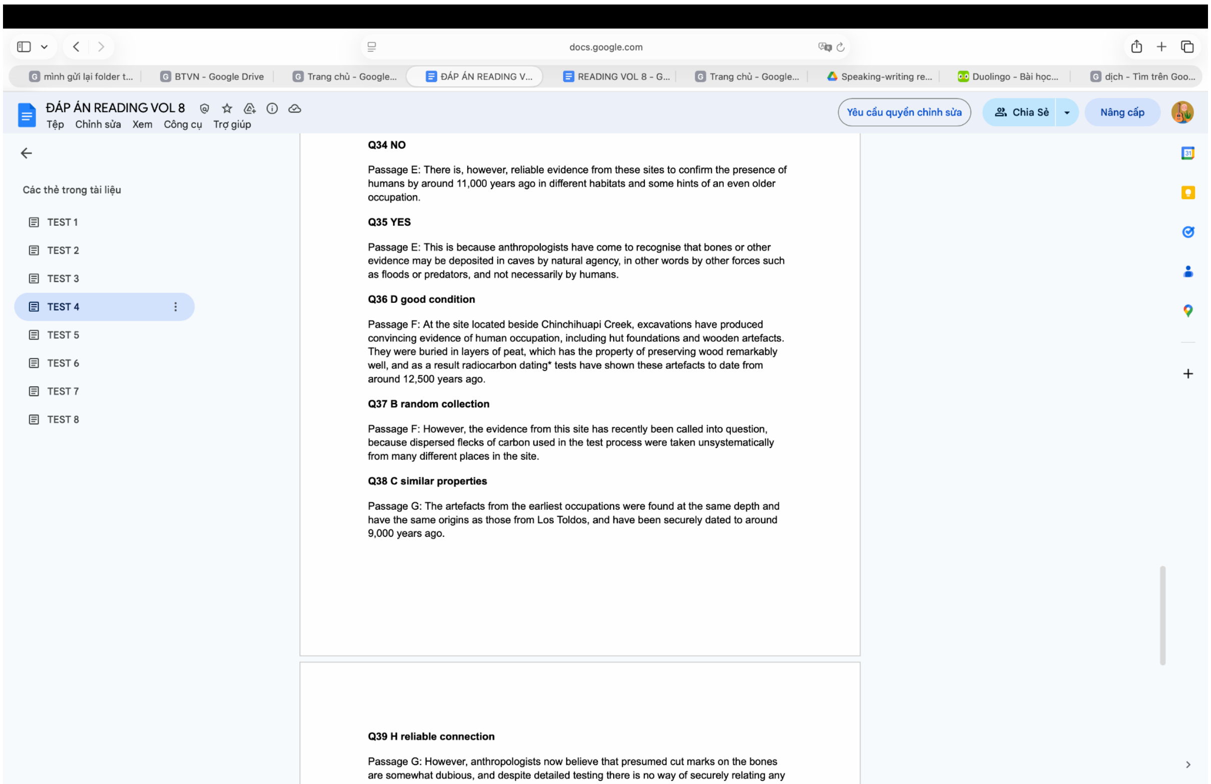
Passage E: We can speculate then that the retreat of the Patagonian glaciers around 14,000 years ago allowed the initial human intrusion into a pristine environment, which was similar to that of early post-glacial Europe.

33 NOT GIVEN

Passage E: Human settlement of the vast horizontal expanse of treeless high country must have been tenuous at best, and the evidence for this occupation remains relatively scant, most of it coming from rock shelters in Argentina and Chile.

Q34 NO

Passage E: There is, however, reliable evidence from these sites to confirm the presence of humans by around 11,000 years ago in different habitats and some hints of an even older occupation.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Q34 NO

Passage E: There is, however, reliable evidence from these sites to confirm the presence of humans by around 11,000 years ago in different habitats and some hints of an even older occupation.

Q35 YES

Passage E: This is because anthropologists have come to recognise that bones or other evidence may be deposited in caves by natural agency, in other words by other forces such as floods or predators, and not necessarily by humans.

Q36 D good condition

Passage F: At the site located beside Chinchihuapi Creek, excavations have produced convincing evidence of human occupation, including hut foundations and wooden artefacts. They were buried in layers of peat, which has the property of preserving wood remarkably well, and as a result radiocarbon dating* tests have shown these artefacts to date from around 12,500 years ago.

Q37 B random collection

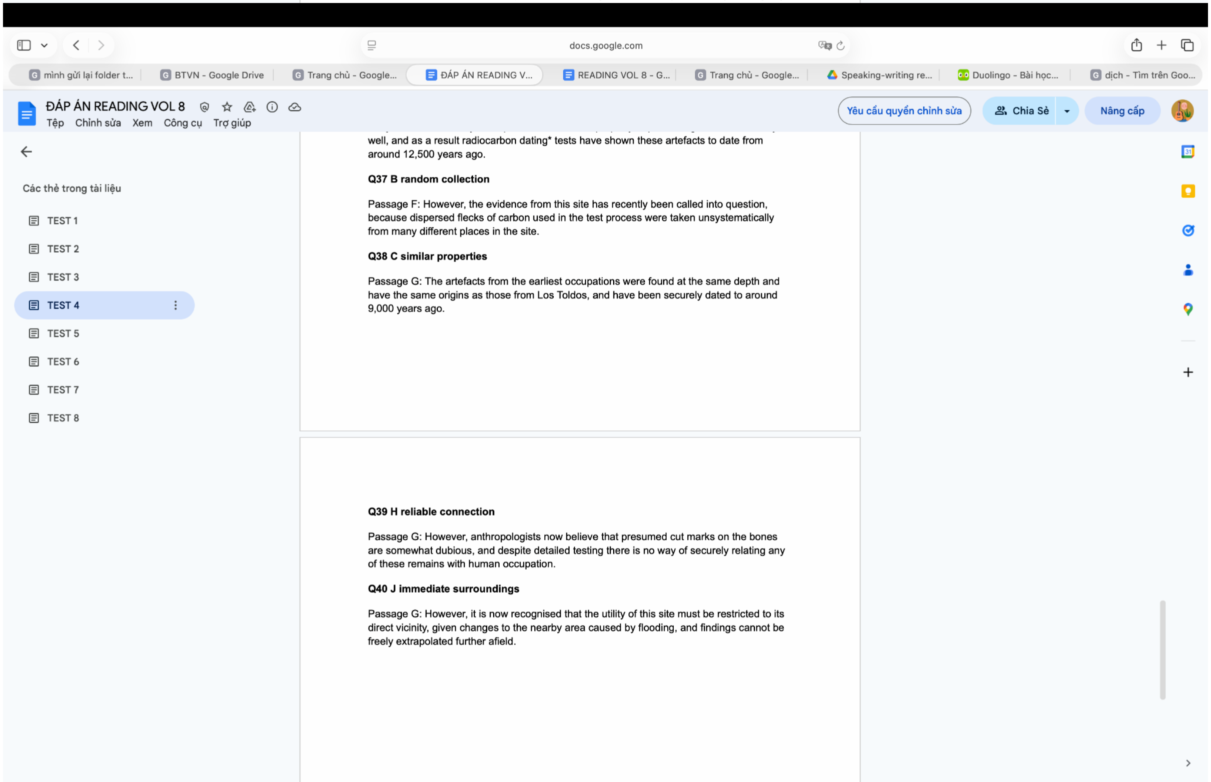
Passage F: However, the evidence from this site has recently been called into question, because dispersed flecks of carbon used in the test process were taken unsystematically from many different places in the site.

Q38 C similar properties

Passage G: The artefacts from the earliest occupations were found at the same depth and have the same origins as those from Los Toldos, and have been securely dated to around 9,000 years ago.

Q39 H reliable connection

Passage G: However, anthropologists now believe that presumed cut marks on the bones are somewhat dubious, and despite detailed testing there is no way of securely relating any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Q37 B random collection

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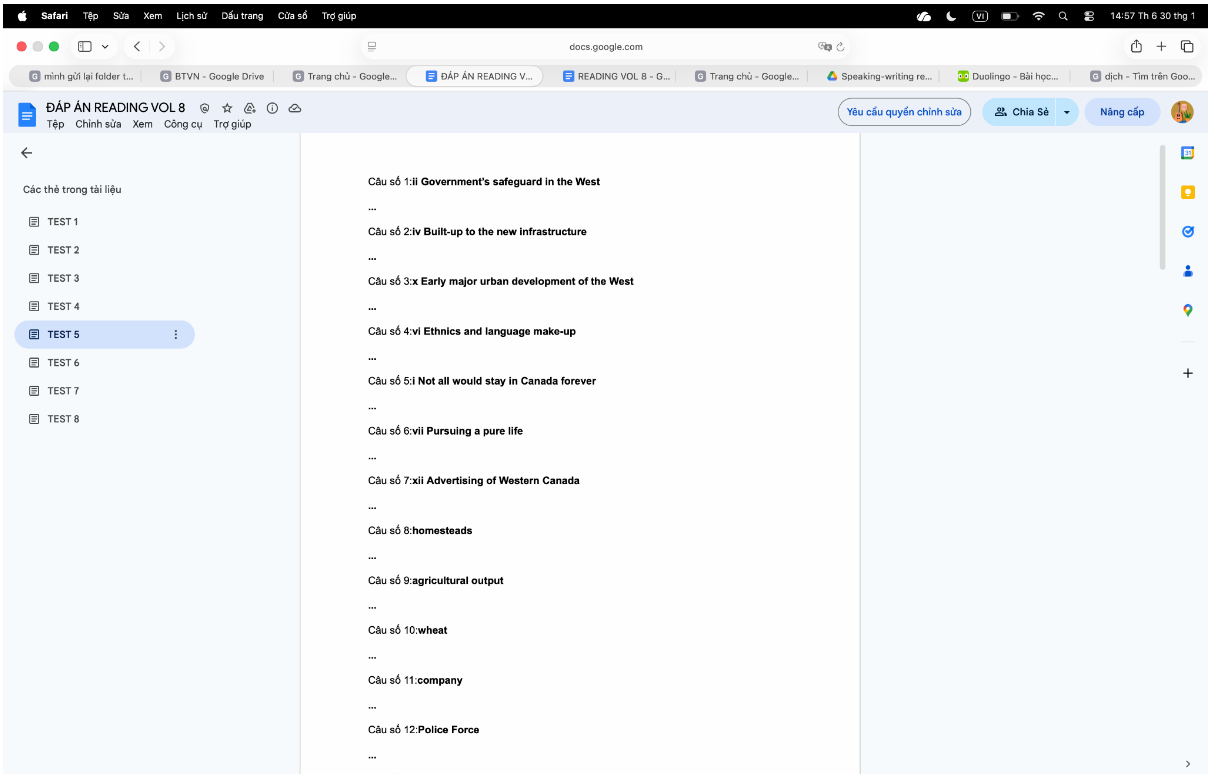
Passage G: The artefacts from the earliest occupations were found at the same depth and have the same origins as those from Los Toldos, and have been securely dated to around 9,000 years ago.

Q39 H reliable connection

Passage G: However, anthropologists now believe that presumed cut marks on the bones are somewhat dubious, and despite detailed testing there is no way of securely relating any of these remains with human occupation.

Q40 J immediate surroundings

Passage G: However, it is now recognised that the utility of this site must be restricted to its direct vicinity, given changes to the nearby area caused by flooding, and findings cannot be freely extrapolated further afield.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Câu số 1:**ii Government's safeguard in the West**

...

Câu số 2:**iv Built-up to the new infrastructure**

...

Câu số 3:**x Early major urban development of the West**

...

Câu số 4:**vi Ethnics and language make-up**

...

Câu số 5:**i Not all would stay in Canada forever**

...

Câu số 6:**vii Pursuing a pure life**

...

Câu số 7:**xii Advertising of Western Canada**

...

Câu số 8:**homesteads**

...

Câu số 9:**agricultural output**

...

Câu số 10:**wheat**

...

Câu số 11:**company**

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Câu số 12:**Police Force**

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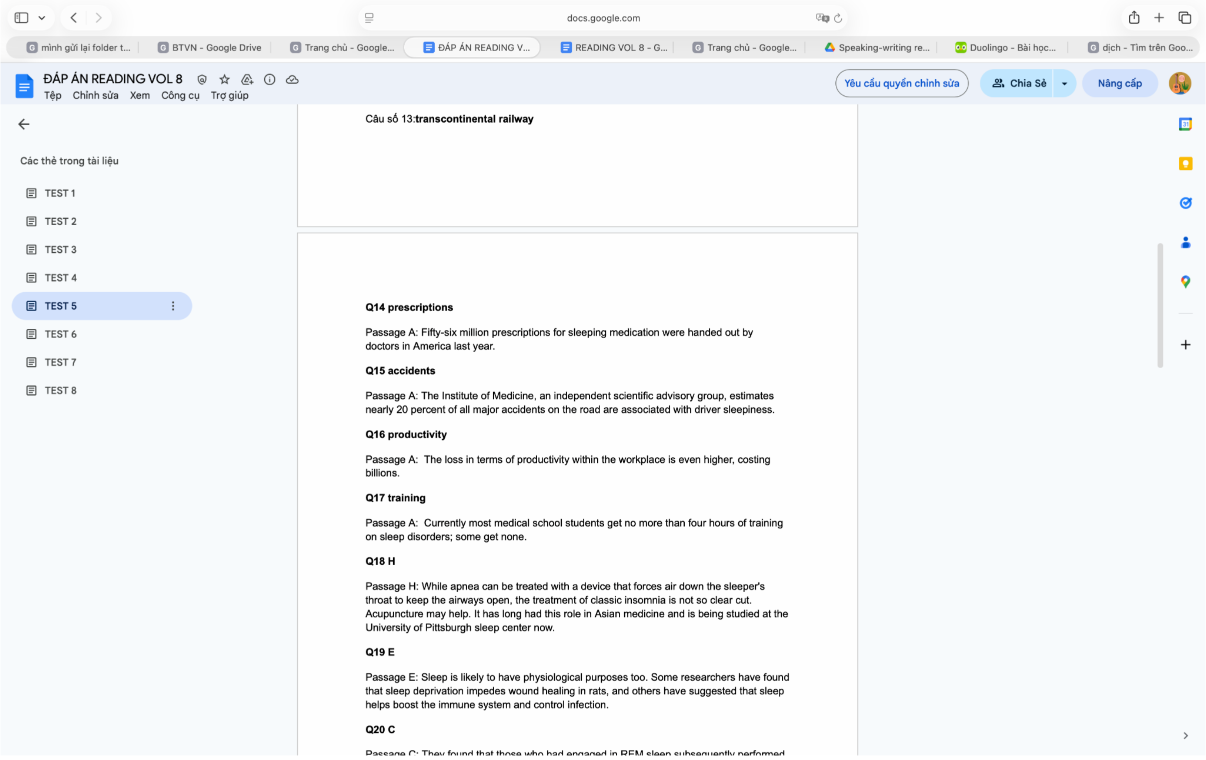
Câu số 13:**transcontinental railway**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Câu số 13:**transcontinental railway**

Q14 prescriptions

Passage A: Fifty-six million prescriptions for sleeping medication were handed out by doctors in America last year.

Q15 accidents

Passage A: The Institute of Medicine, an independent scientific advisory group, estimates nearly 20 percent of all major accidents on the road are associated with driver sleepiness.

Q16 productivity

Passage A: The loss in terms of productivity within the workplace is even higher, costing billions.

Q17 training

Passage A: Currently most medical school students get no more than four hours of training on sleep disorders; some get none.

Q18 H

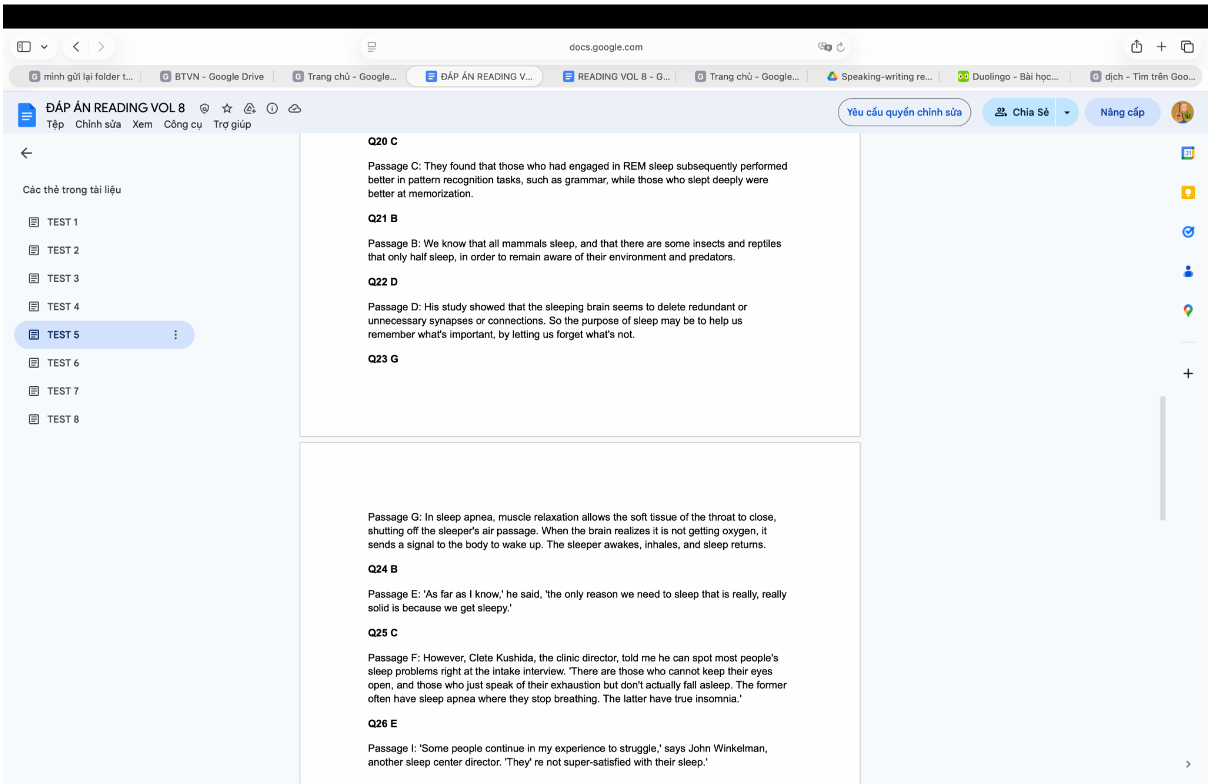
Passage H: While apnea can be treated with a device that forces air down the sleeper's throat to keep the airways open, the treatment of classic insomnia is not so clear cut. Acupuncture may help. It has long had this role in Asian medicine and is being studied at the University of Pittsburgh sleep center now.

Q19 E

Passage E: Sleep is likely to have physiological purposes too. Some researchers have found that sleep deprivation impedes wound healing in rats, and others have suggested that sleep helps boost the immune system and control infection.

Q20 C

Passage C: They found that those who had engaged in REM sleep subsequently performed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Q20 C

Passage C: They found that those who had engaged in REM sleep subsequently performed better in pattern recognition tasks, such as grammar, while those who slept deeply were better at memorization.

Q21 B

Passage B: We know that all mammals sleep, and that there are some insects and reptiles that only half sleep, in order to remain aware of their environment and predators.

Q22 D

Passage D: His study showed that the sleeping brain seems to delete redundant or unnecessary synapses or connections. So the purpose of sleep may be to help us remember what's important, by letting us forget what's not.

Q23 G

Passage G: In sleep apnea, muscle relaxation allows the soft tissue of the throat to close, shutting off the sleeper's air passage. When the brain realizes it is not getting oxygen, it sends a signal to the body to wake up. The sleeper awakes, inhales, and sleep returns.

Q24 B

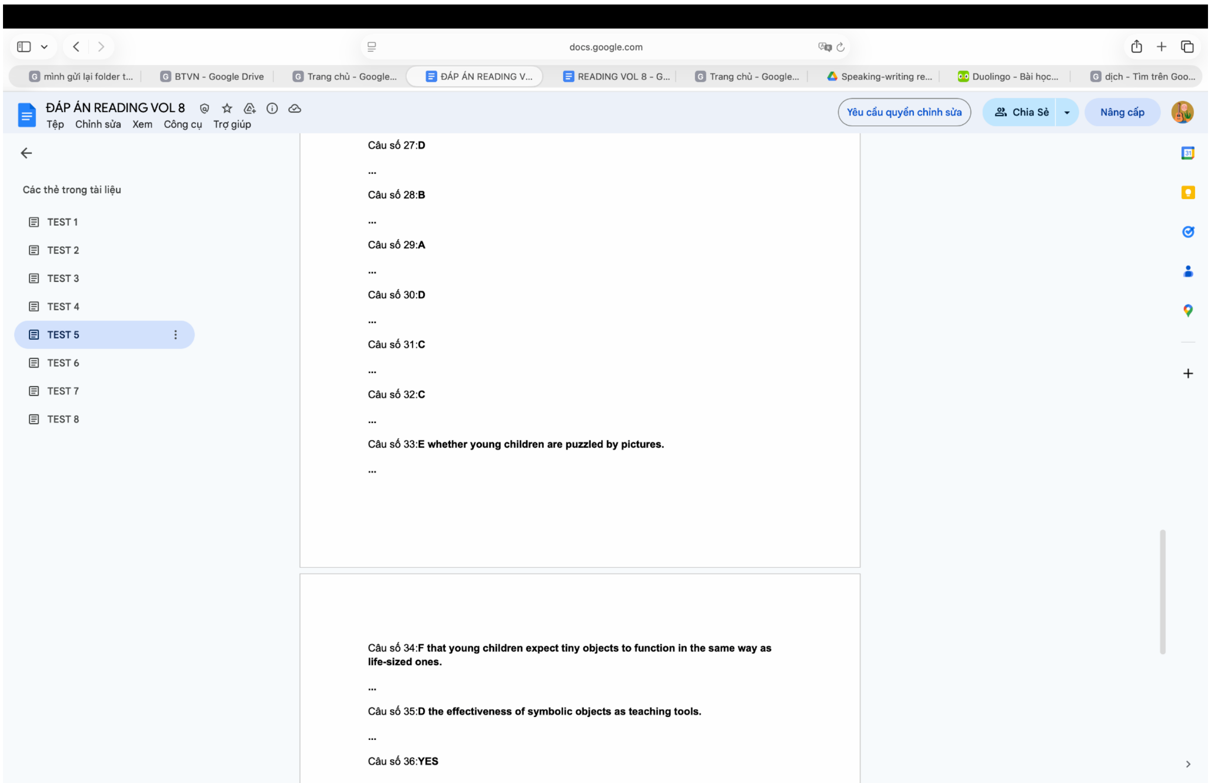
Passage E: 'As far as I know,' he said, 'the only reason we need to sleep that is really, really solid is because we get sleepy.'

Q25 C

Passage F: However, Clete Kushida, the clinic director, told me he can spot most people's sleep problems right at the intake interview. 'There are those who cannot keep their eyes open, and those who just speak of their exhaustion but don't actually fall asleep. The former often have sleep apnea where they stop breathing. The latter have true insomnia.'

Q26 E

Passage I: 'Some people continue in my experience to struggle,' says John Winkelman, another sleep center director. 'They' re not super-satisfied with their sleep.'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Câu số 27:**D**

...

Câu số 28:**B**

...

Câu số 29:**A**

...

Câu số 30:**D**

...

Câu số 31:**C**

...

Câu số 32:**C**

...

Câu số 33:**E whether young children are puzzled by pictures.**

...

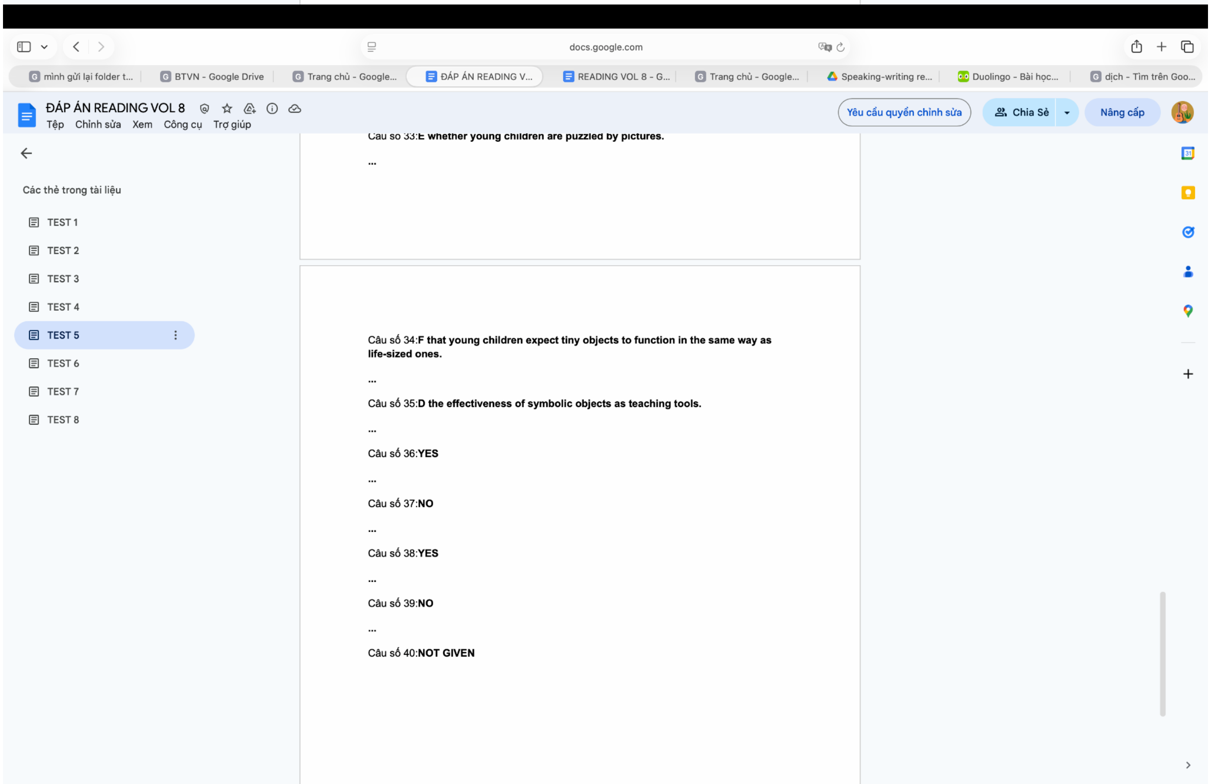
Câu số 34:**F that young children expect tiny objects to function in the same way as life-sized ones.**

...

Câu số 35:**D the effectiveness of symbolic objects as teaching tools.**

...

Câu số 36:**YES**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Câu số 33:**E whether young children are puzzled by pictures.**

...

Câu số 34:**F that young children expect tiny objects to function in the same way as life-sized ones.**

...

Câu số 35:**D the effectiveness of symbolic objects as teaching tools.**

...

Câu số 36:**YES**

...

Câu số 37:**NO**

...

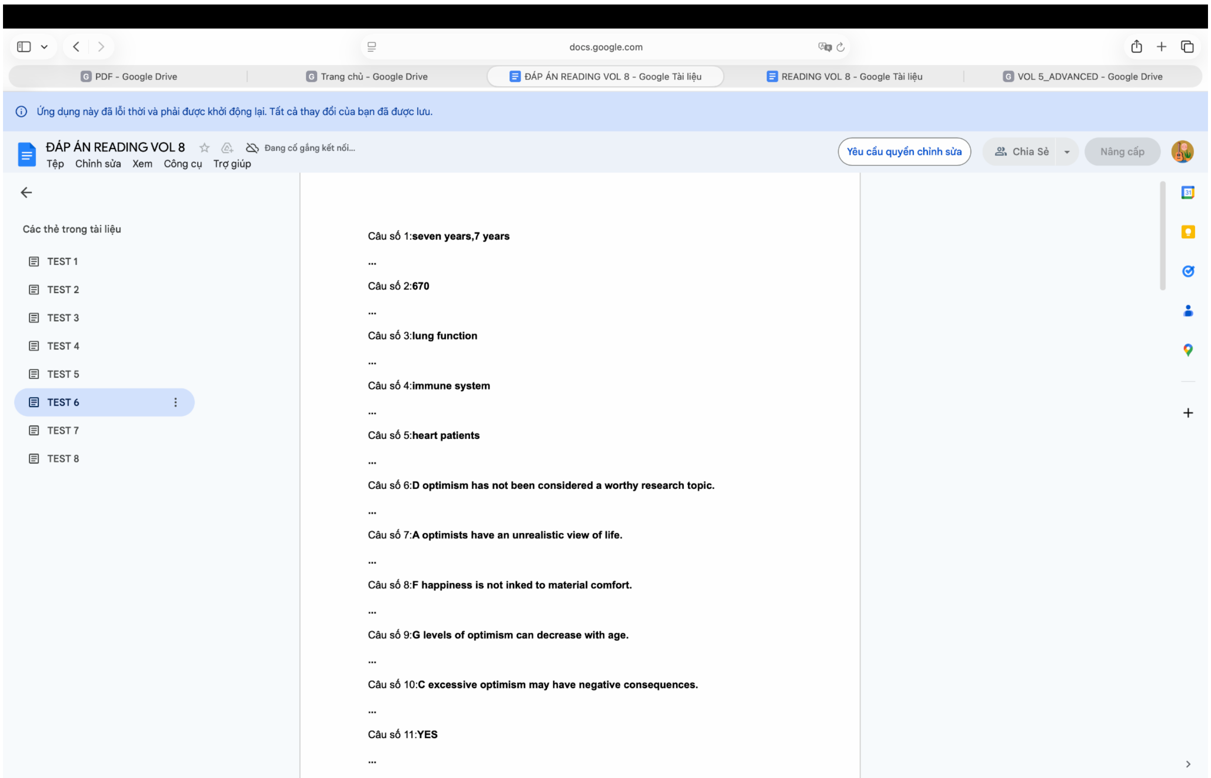
Câu số 38:**YES**

...

Câu số 39:**NO**

...

Câu số 40:**NOT GIVEN**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Câu số 1:**seven years,7 years**

...

Câu số 2:**670**

...

Câu số 3:**lung function**

...

Câu số 4:**immune system**

...

Câu số 5:**heart patients**

...

Câu số 6:**D optimism has not been considered a worthy research topic.**

...

Câu số 7:**A optimists have an unrealistic view of life.**

...

Câu số 8:**F happiness is not inked to material comfort.**

...

Câu số 9:**G levels of optimism can decrease with age.**

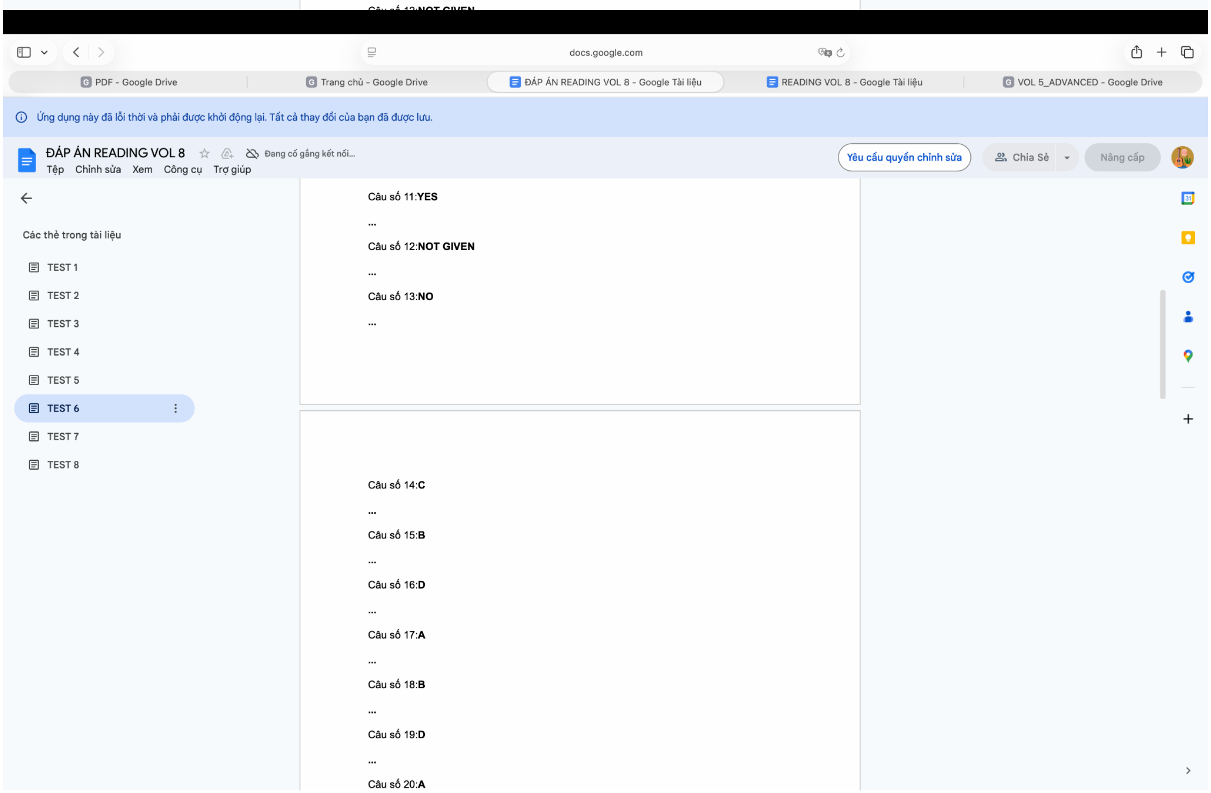
...

Câu số 10:**C excessive optimism may have negative consequences.**

...

Câu số 11:**YES**

...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Câu số 11:**YES**

...

Câu số 12:**NOT GIVEN**

...

Câu số 13:**NO**

...

Câu số 14:**C**

...

Câu số 15:**B**

...

Câu số 16:**D**

...

Câu số 17:**A**

...

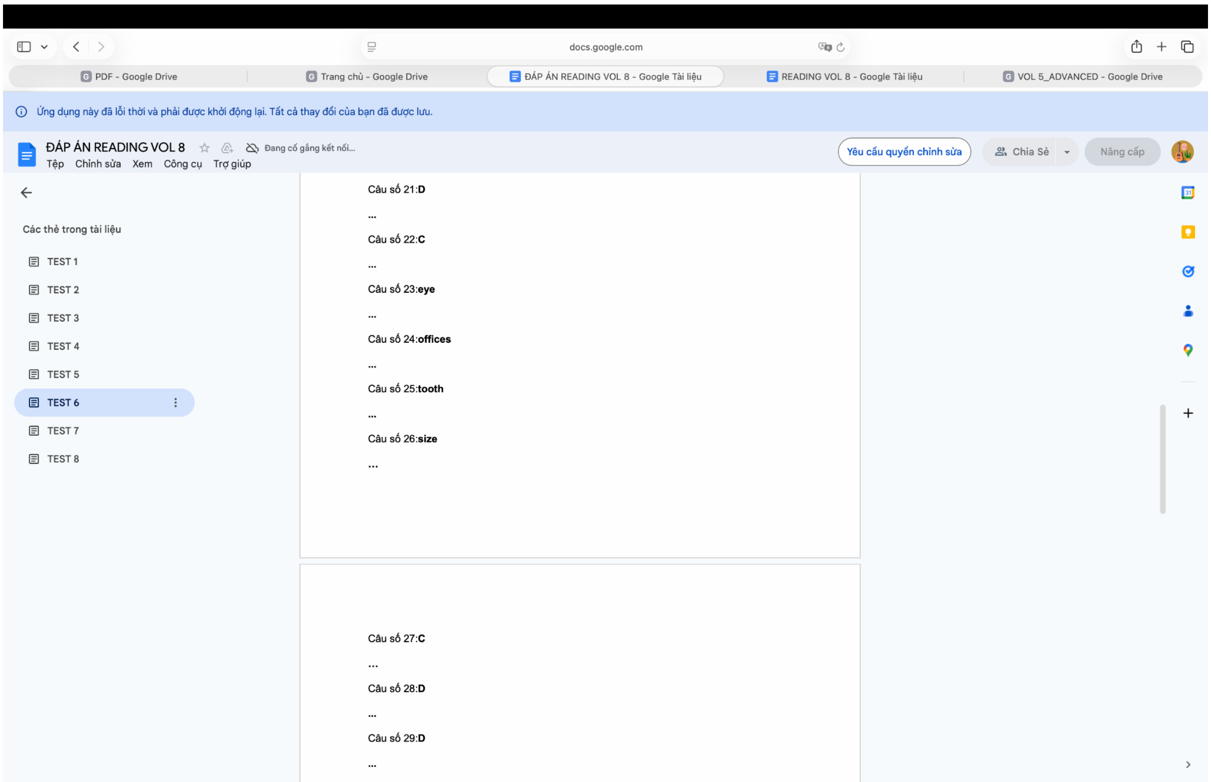
Câu số 18:**B**

...

Câu số 19:**D**

...

Câu số 20:**A**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Câu số 21:**D**

...

Câu số 22:**C**

...

Câu số 23:**eye**

...

Câu số 24:**offices**

...

Câu số 25:**tooth**

...

Câu số 26:**size**

...

Câu số 27:**C**

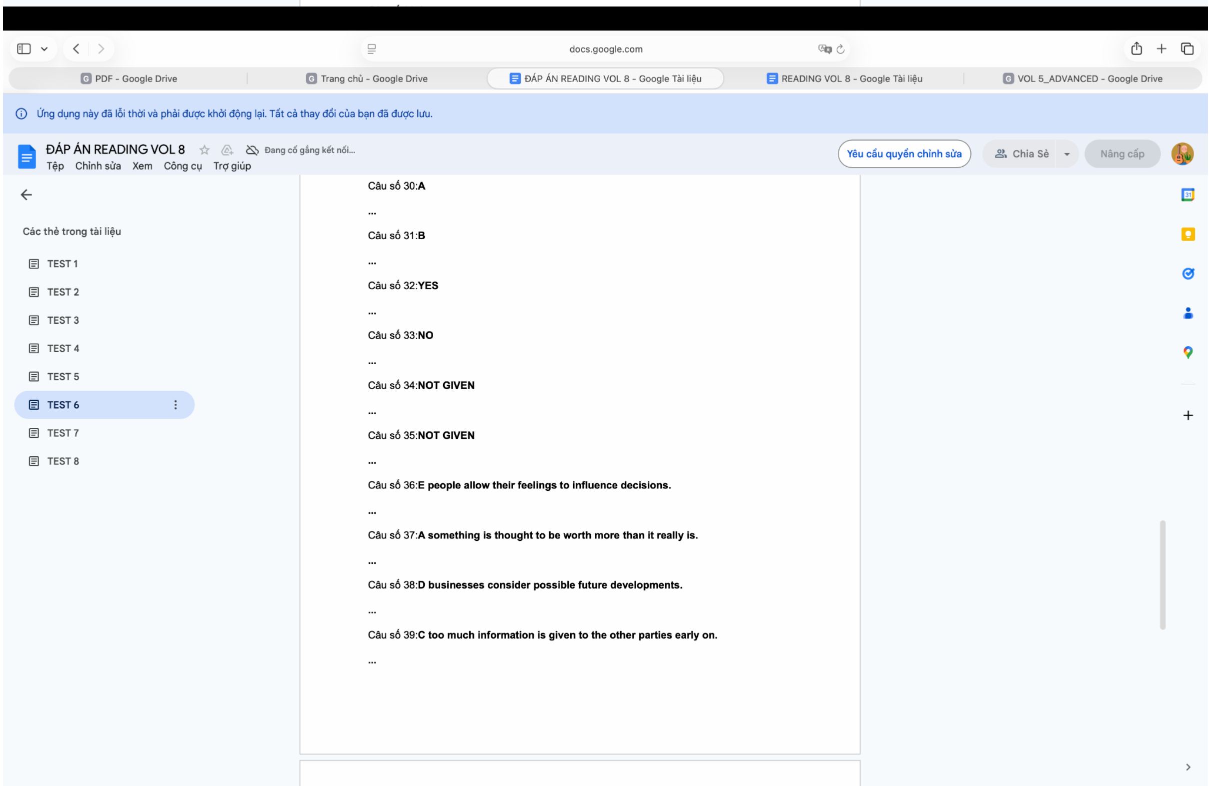
...

Câu số 28:**D**

...

Câu số 29:**D**

...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Câu số 30:**A**

...

Câu số 31:**B**

...

Câu số 32:**YES**

...

Câu số 33:**NO**

...

Câu số 34:**NOT GIVEN**

...

Câu số 35:**NOT GIVEN**

...

Câu số 36:**E people allow their feelings to influence decisions.**

...

Câu số 37:**A something is thought to be worth more than it really is.**

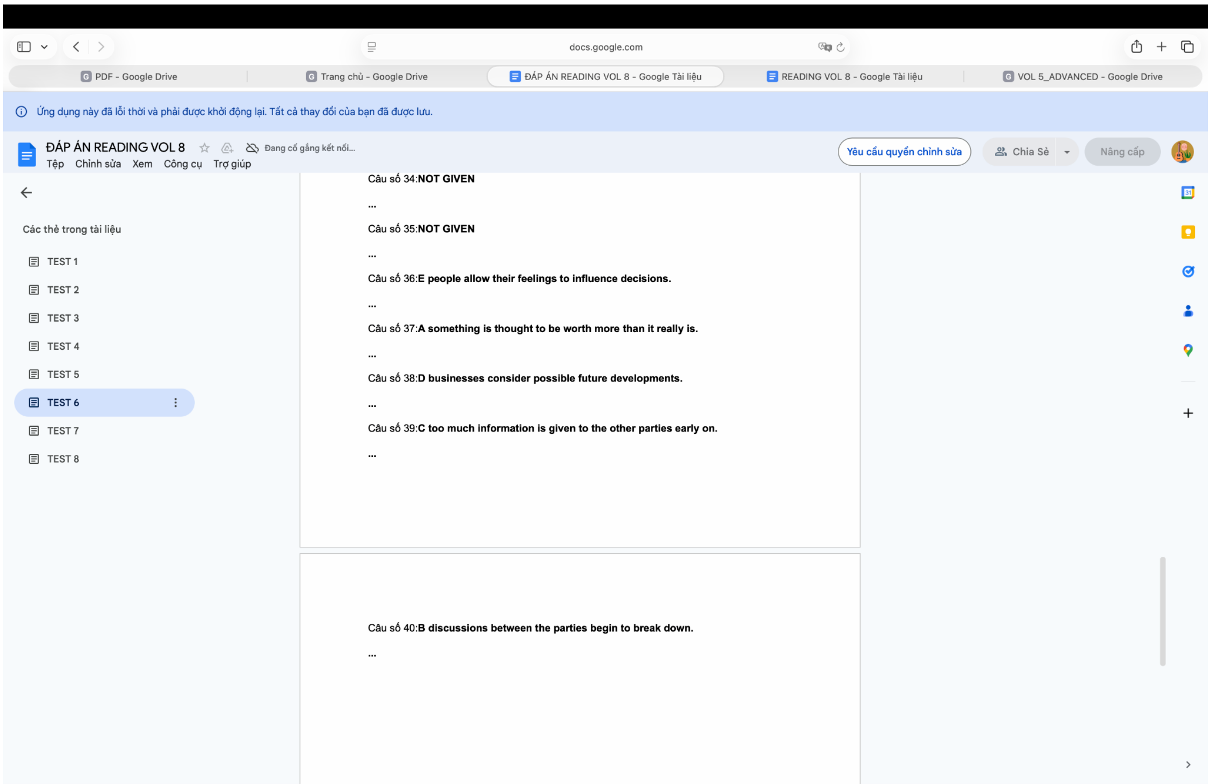
...

Câu số 38:**D businesses consider possible future developments.**

...

Câu số 39:**C too much information is given to the other parties early on.**

...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Câu số 34:**NOT GIVEN**

...

Câu số 35:**NOT GIVEN**

...

Câu số 36:**E people allow their feelings to influence decisions.**

...

Câu số 37:**A something is thought to be worth more than it really is.**

...

Câu số 38:**D businesses consider possible future developments.**

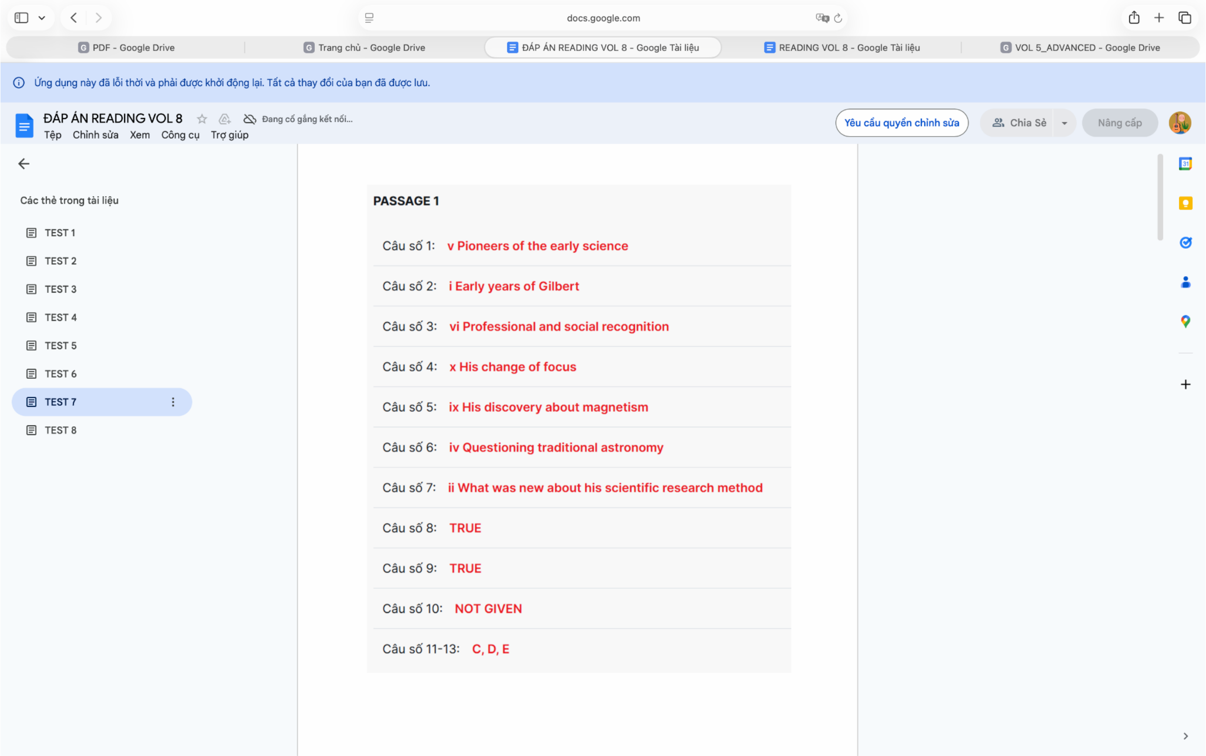
...

Câu số 39:**C too much information is given to the other parties early on.**

...

Câu số 40:**B discussions between the parties begin to break down.**

...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PASSAGE 1

Câu số 1: v Pioneers of the early science

Câu số 2: i Early years of Gilbert

Câu số 3: vi Professional and social recognition

Câu số 4: x His change of focus

Câu số 5: ix His discovery about magnetism

Câu số 6: iv Questioning traditional astronomy

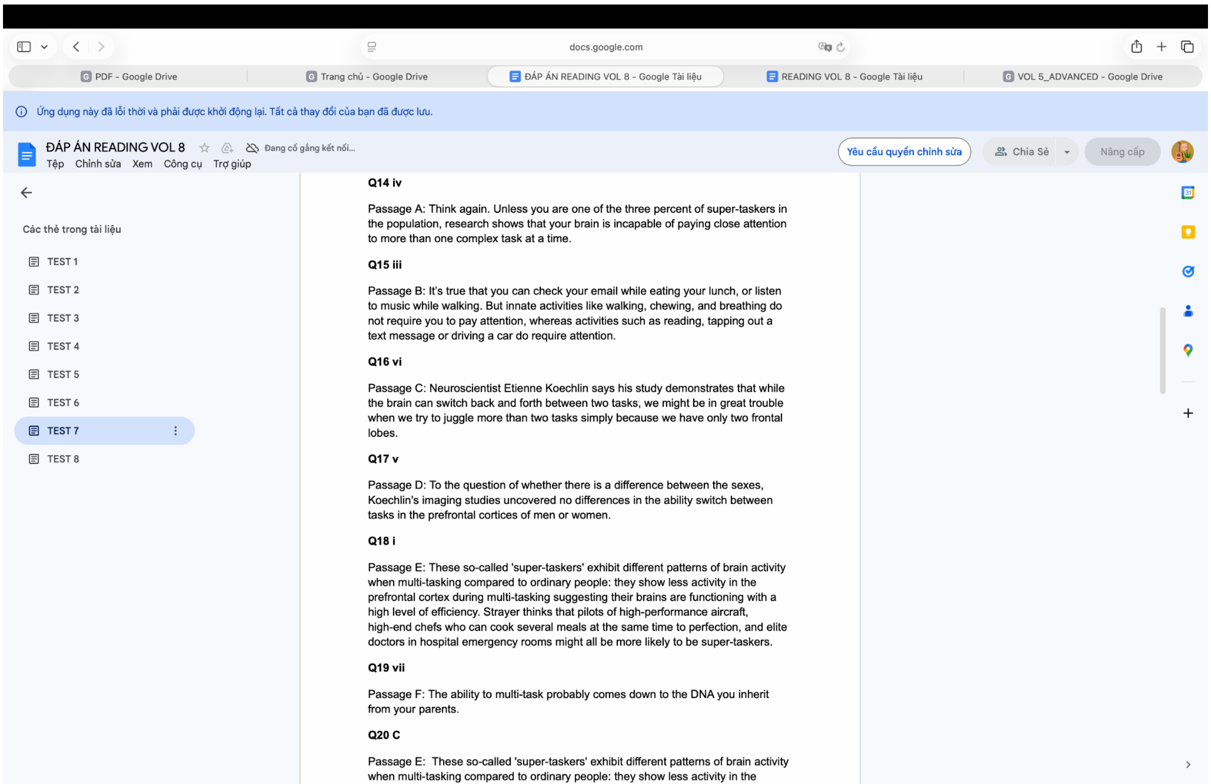
Câu số 7: ii What was new about his scientific research method

Câu số 8: TRUE

Câu số 9: TRUE

Câu số 10: NOT GIVEN

Câu số 11-13: C, D, E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Q14 iv

Passage A: Think again. Unless you are one of the three percent of super-taskers in the population, research shows that your brain is incapable of paying close attention to more than one complex task at a time.

Q15 iii

Passage B: It's true that you can check your email while eating your lunch, or listen to music while walking. But innate activities like walking, chewing, and breathing do not require you to pay attention, whereas activities such as reading, tapping out a text message or driving a car do require attention.

Q16 vi

Passage C: Neuroscientist Etienne Koechlin says his study demonstrates that while the brain can switch back and forth between two tasks, we might be in great trouble when we try to juggle more than two tasks simply because we have only two frontal lobes.

Q17 v

Passage D: To the question of whether there is a difference between the sexes, Koechlin's imaging studies uncovered no differences in the ability switch between tasks in the prefrontal cortices of men or women.

Q18 i

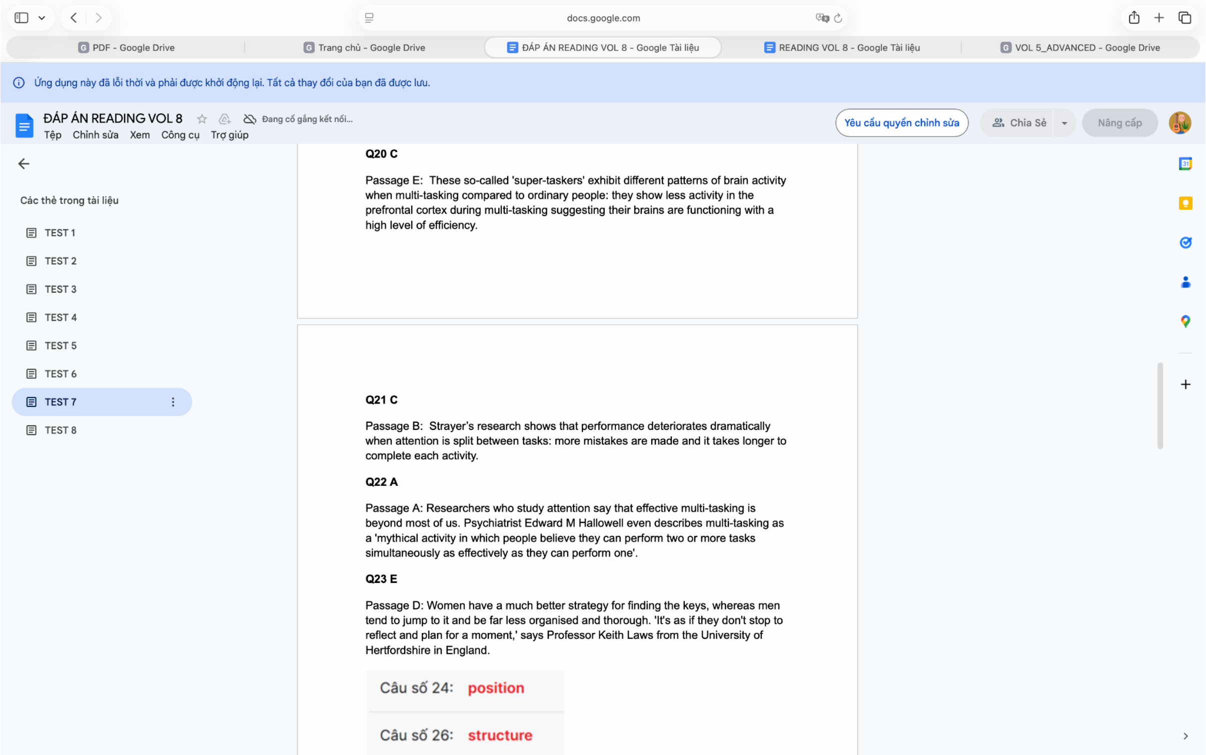
Passage E: These so-called 'super-taskers' exhibit different patterns of brain activity when multi-tasking compared to ordinary people: they show less activity in the prefrontal cortex during multi-tasking suggesting their brains are functioning with a high level of efficiency. Strayer thinks that pilots of high-performance aircraft, high-end chefs who can cook several meals at the same time to perfection, and elite doctors in hospital emergency rooms might all be more likely to be super-taskers.

Q19 vii

Passage F: The ability to multi-task probably comes down to the DNA you inherit from your parents.

Q20 C

Passage E: These so-called 'super-taskers' exhibit different patterns of brain activity when multi-tasking compared to ordinary people: they show less activity in the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Q20 C

Passage E: These so-called 'super-taskers' exhibit different patterns of brain activity when multi-tasking compared to ordinary people: they show less activity in the
prefrontal cortex during multi-tasking suggesting their brains are functioning with a high level of efficiency.

Q21 C

Passage B: Strayer's research shows that performance deteriorates dramatically when attention is split between tasks: more mistakes are made and it takes longer to complete each activity.

Q22 A

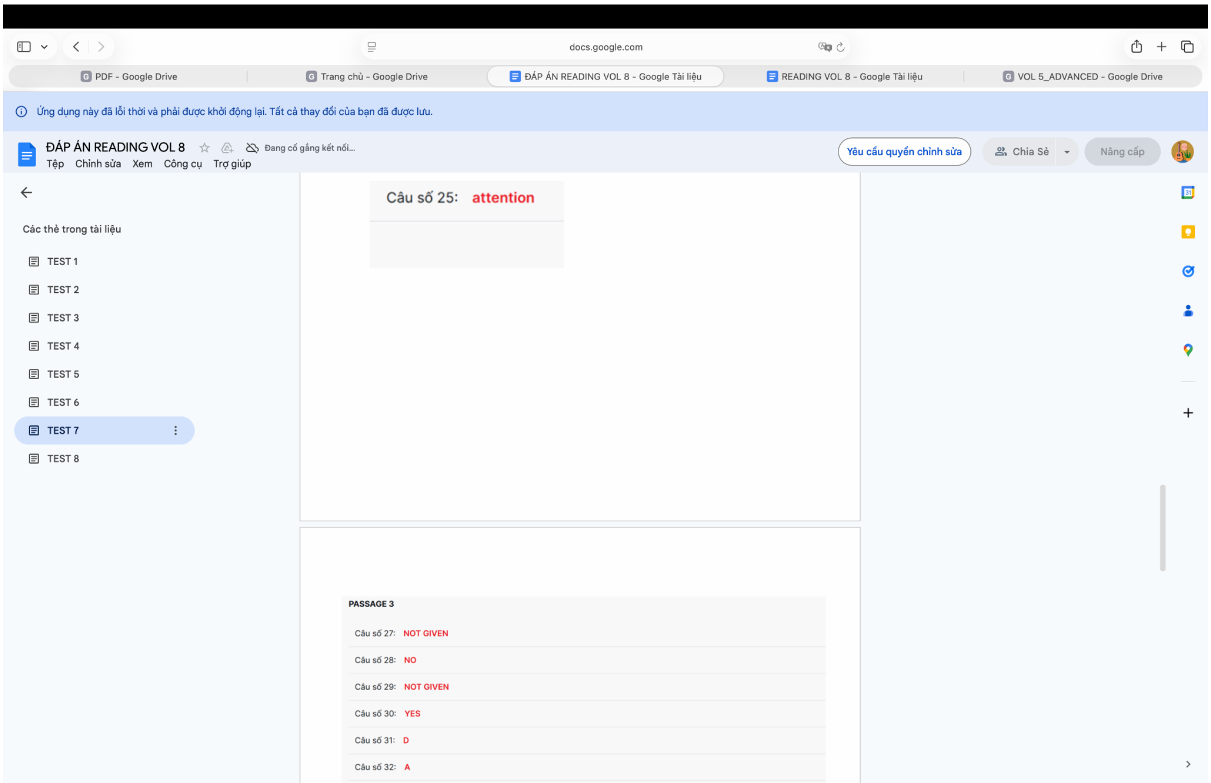
Passage A: Researchers who study attention say that effective multi-tasking is beyond most of us. Psychiatrist Edward M Hallowell even describes multi-tasking as a 'mythical activity in which people believe they can perform two or more tasks simultaneously as effectively as they can perform one'.

Q23 E

Passage D: Women have a much better strategy for finding the keys, whereas men tend to jump to it and be far less organised and thorough. 'It's as if they don't stop to reflect and plan for a moment,' says Professor Keith Laws from the University of Hertfordshire in England.

Câu số 24: position

Câu số 26: structure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Câu số 25: attention

PASSAGE 3

Câu số 27: NOT GIVEN

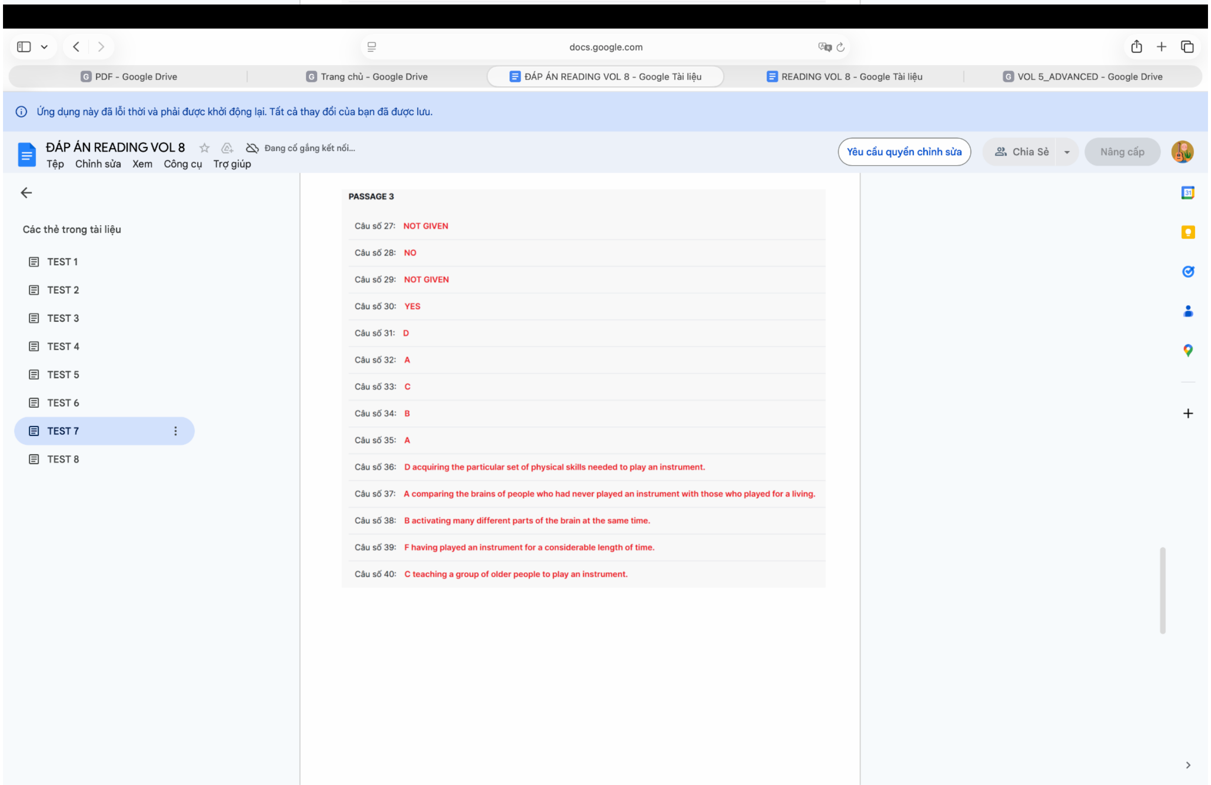
Câu số 28: NO

Câu số 29: NOT GIVEN

Câu số 30: YES

Câu số 31: D

Câu số 32: A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PASSAGE 3

Câu số 27: NOT GIVEN

Câu số 28: NO

Câu số 29: NOT GIVEN

Câu số 30: YES

Câu số 31: D

Câu số 32: A

Câu số 33: C

Câu số 34: B

Câu số 35: A

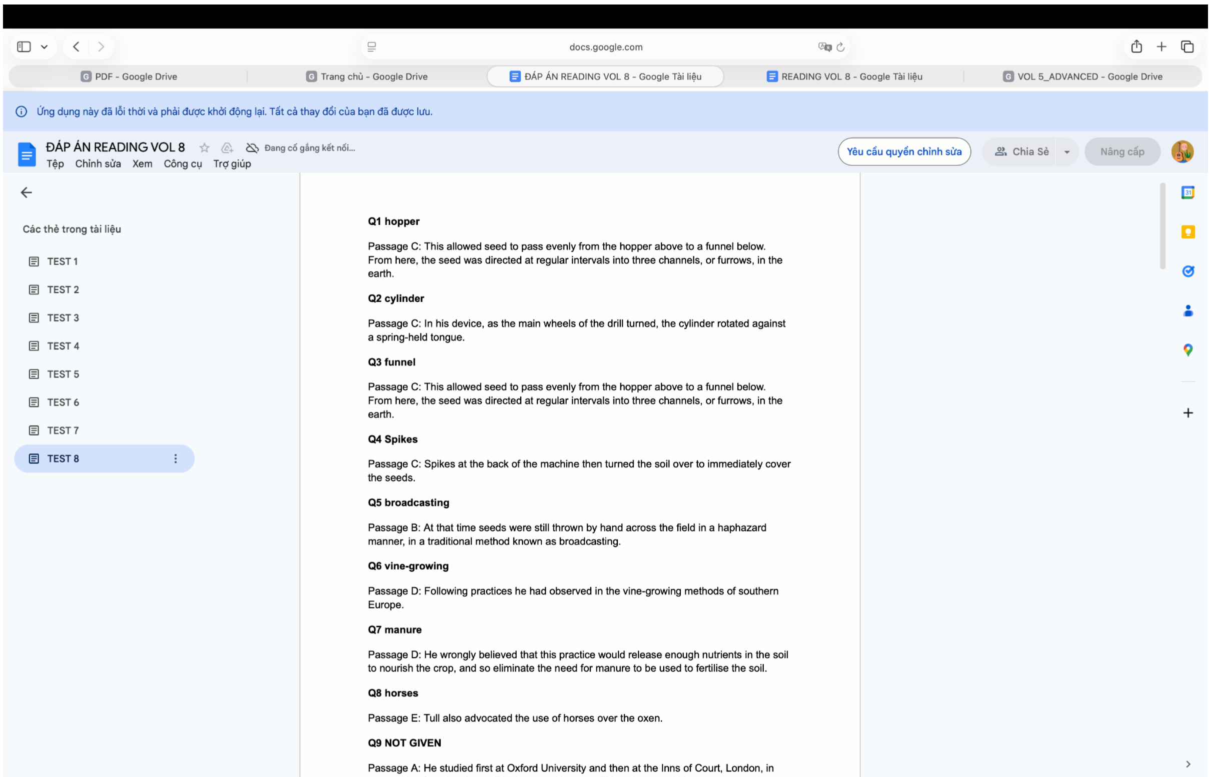
Câu số 36: D acquiring the particular set of physical skills needed to play an instrument.

Câu số 37: A comparing the brains of people who had never played an instrument with those who played for a living.

Câu số 38: B activating many different parts of the brain at the same time.

Câu số 39: F having played an instrument for a considerable length of time.

Câu số 40: C teaching a group of older people to play an instrument.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Q1 hopper

Passage C: This allowed seed to pass evenly from the hopper above to a funnel below. From here, the seed was directed at regular intervals into three channels, or furrows, in the earth.

Q2 cylinder

Passage C: In his device, as the main wheels of the drill turned, the cylinder rotated against a spring-held tongue.

Q3 funnel

Passage C: This allowed seed to pass evenly from the hopper above to a funnel below. From here, the seed was directed at regular intervals into three channels, or furrows, in the earth.

Q4 Spikes

Passage C: Spikes at the back of the machine then turned the soil over to immediately cover the seeds.

Q5 broadcasting

Passage B: At that time seeds were still thrown by hand across the field in a haphazard manner, in a traditional method known as broadcasting.

Q6 vine-growing

Passage D: Following practices he had observed in the vine-growing methods of southern Europe.

Q7 manure

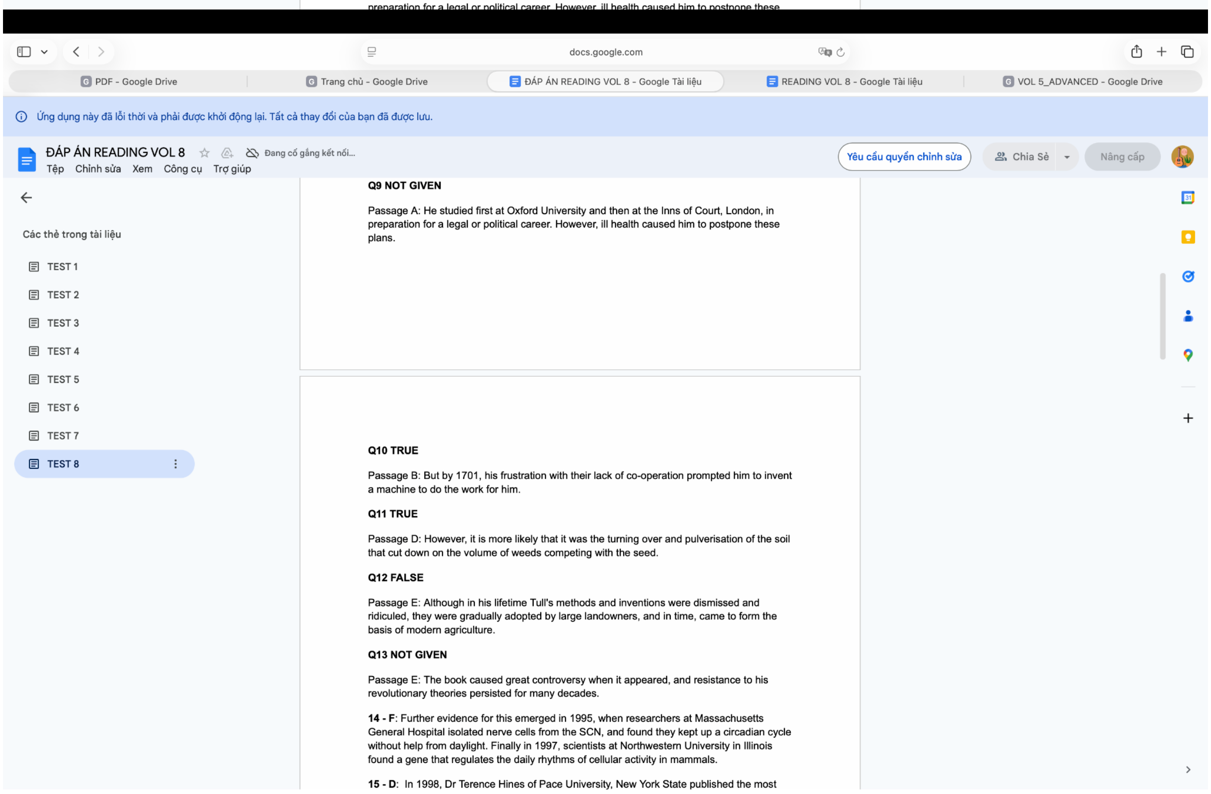
Passage D: He wrongly believed that this practice would release enough nutrients in the soil to nourish the crop, and so eliminate the need for manure to be used to fertilise the soil.

Q8 horses

Passage E: Tull also advocated the use of horses over the oxen.

Q9 NOT GIVEN

Passage A: He studied first at Oxford University and then at the Inns of Court, London, in preparation for a legal or political career. However, ill health caused him to postpone these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Q9 NOT GIVEN

Passage A: He studied first at Oxford University and then at the Inns of Court, London, in preparation for a legal or political career. However, ill health caused him to postpone these plans.

Q10 TRUE

Passage B: But by 1701, his frustration with their lack of co-operation prompted him to invent a machine to do the work for him.

Q11 TRUE

Passage D: However, it is more likely that it was the turning over and pulverisation of the soil that cut down on the volume of weeds competing with the seed.

Q12 FALSE

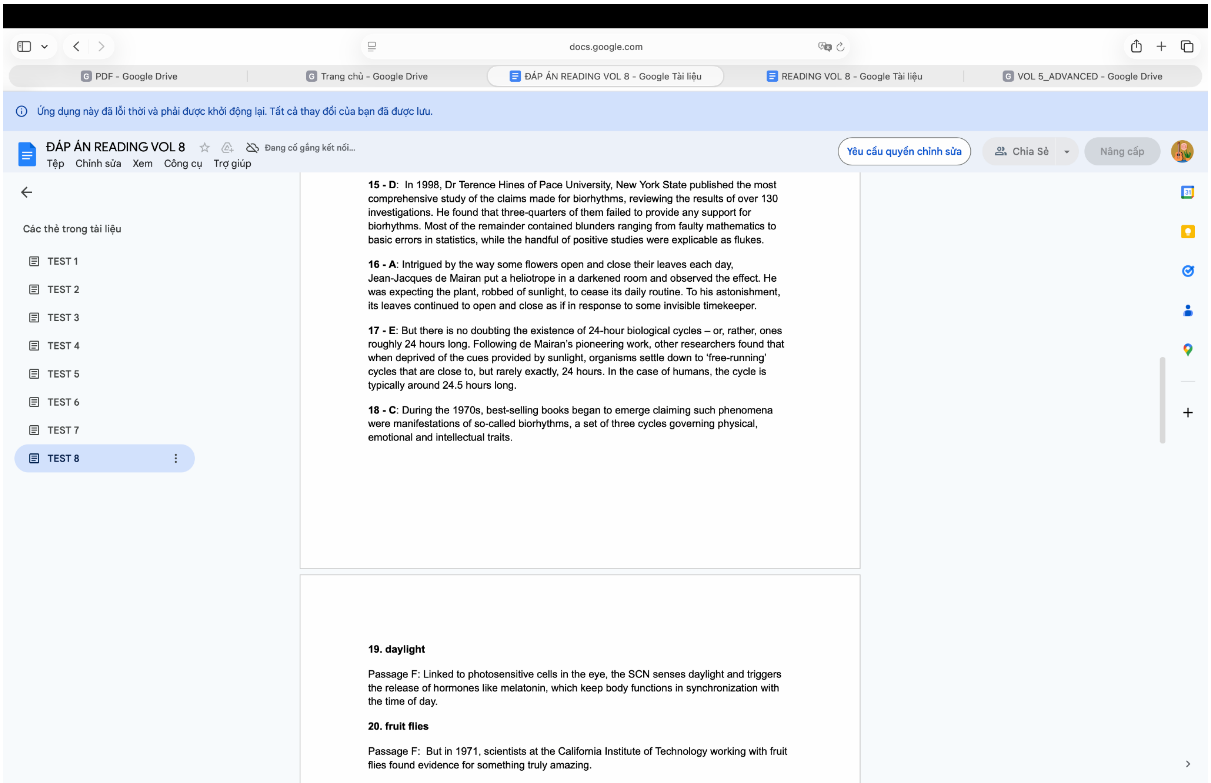
Passage E: Although in his lifetime Tull's methods and inventions were dismissed and ridiculed, they were gradually adopted by large landowners, and in time, came to form the basis of modern agriculture.

Q13 NOT GIVEN

Passage E: The book caused great controversy when it appeared, and resistance to his revolutionary theories persisted for many decades.

14 - F: Further evidence for this emerged in 1995, when researchers at Massachusetts General Hospital isolated nerve cells from the SCN, and found they kept up a circadian cycle without help from daylight. Finally in 1997, scientists at Northwestern University in Illinois found a gene that regulates the daily rhythms of cellular activity in mammals.

15 - D: In 1998, Dr Terence Hines of Pace University, New York State published the most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15 - D: In 1998, Dr Terence Hines of Pace University, New York State published the most comprehensive study of the claims made for biorhythms, reviewing the results of over 130 investigations. He found that three-quarters of them failed to provide any support for biorhythms. Most of the remainder contained blunders ranging from faulty mathematics to basic errors in statistics, while the handful of positive studies were explicable as flukes.

16 - A: Intrigued by the way some flowers open and close their leaves each day, Jean-Jacques de Mairan put a heliotrope in a darkened room and observed the effect. He was expecting the plant, robbed of sunlight, to cease its daily routine. To his astonishment, its leaves continued to open and close as if in response to some invisible timekeeper.

17 - E: But there is no doubting the existence of 24-hour biological cycles – or, rather, ones roughly 24 hours long. Following de Mairan's pioneering work, other researchers found that when deprived of the cues provided by sunlight, organisms settle down to 'free-running' cycles that are close to, but rarely exactly, 24 hours. In the case of humans, the cycle is typically around 24.5 hours long.

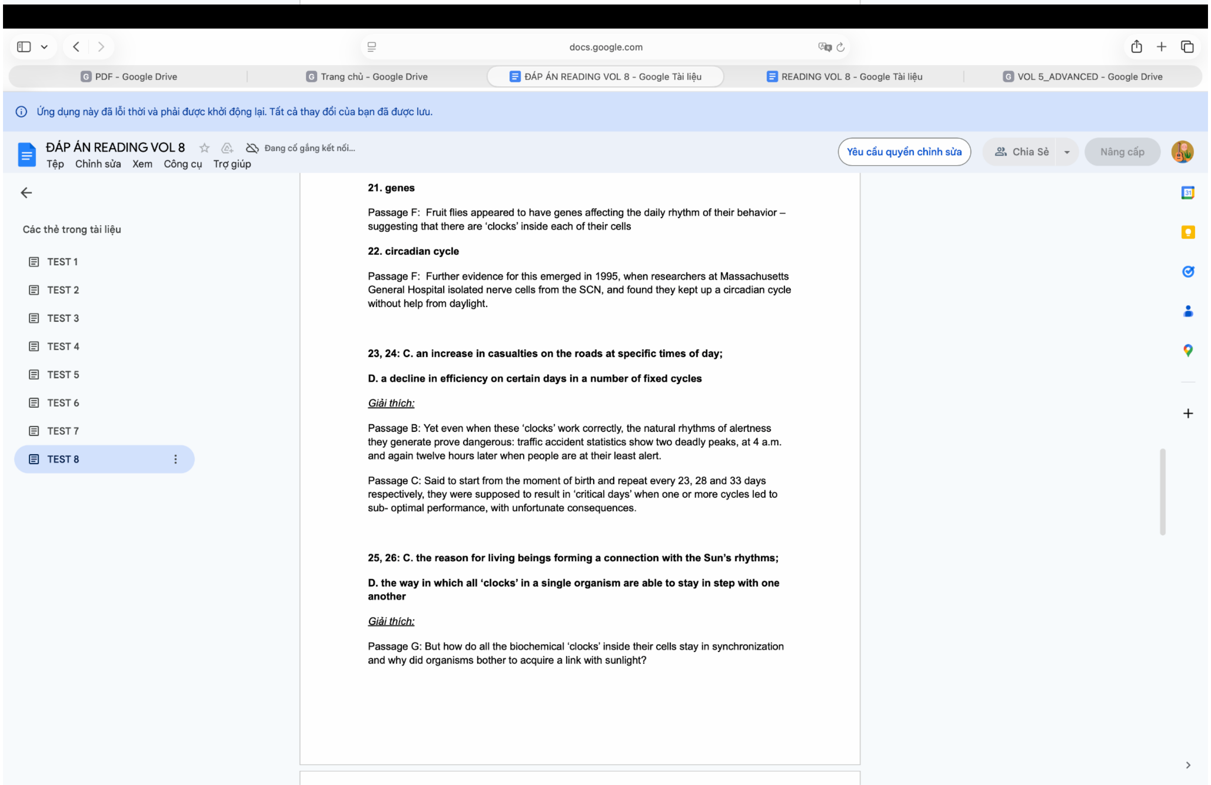
18 - C: During the 1970s, best-selling books began to emerge claiming such phenomena were manifestations of so-called biorhythms, a set of three cycles governing physical, emotional and intellectual traits.

19. daylight

Passage F: Linked to photosensitive cells in the eye, the SCN senses daylight and triggers the release of hormones like melatonin, which keep body functions in synchronization with the time of day.

20. fruit flies

Passage F: But in 1971, scientists at the California Institute of Technology working with fruit flies found evidence for something truly amazing.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21. genes

Passage F: Fruit flies appeared to have genes affecting the daily rhythm of their behavior – suggesting that there are 'clocks' inside each of their cells

22. circadian cycle

Passage F: Further evidence for this emerged in 1995, when researchers at Massachusetts General Hospital isolated nerve cells from the SCN, and found they kept up a circadian cycle without help from daylight.

23, 24: C. an increase in casualties on the roads at specific times of day;

D. a decline in efficiency on certain days in a number of fixed cycles

Giải thích:

Passage B: Yet even when these 'clocks' work correctly, the natural rhythms of alertness they generate prove dangerous: traffic accident statistics show two deadly peaks, at 4 a.m. and again twelve hours later when people are at their least alert.

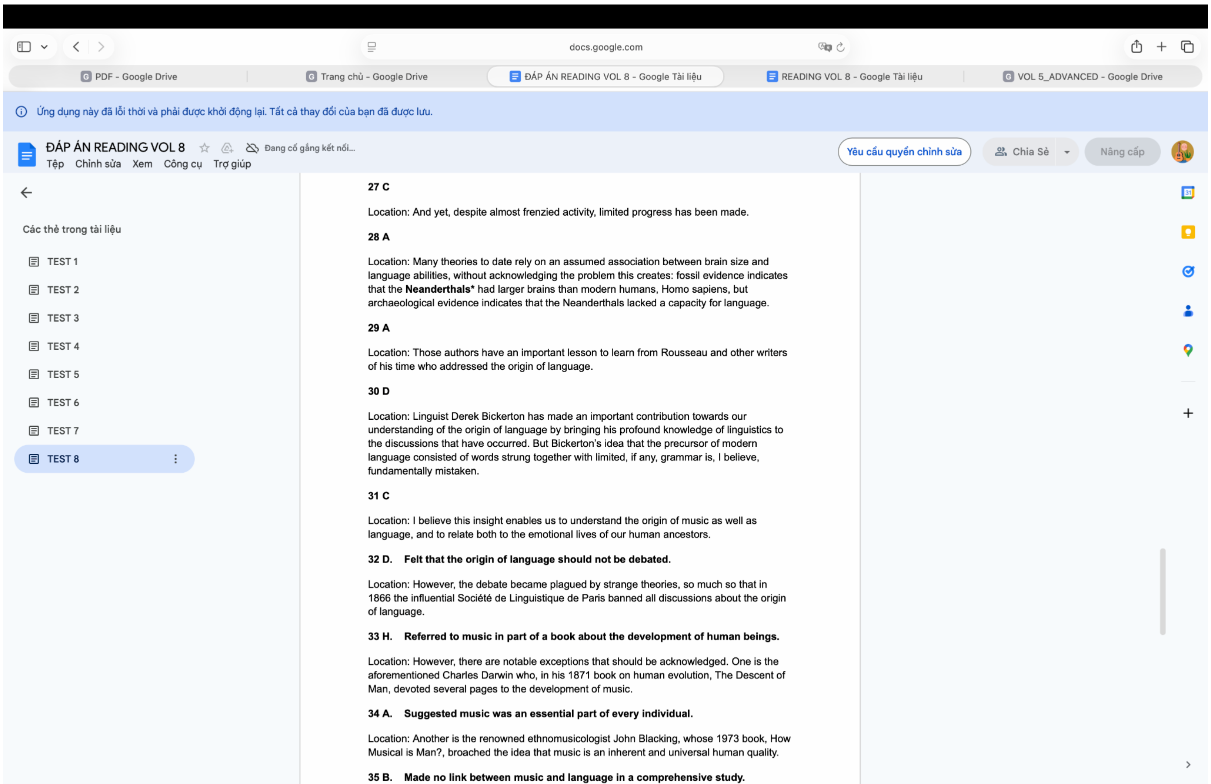
Passage C: Said to start from the moment of birth and repeat every 23, 28 and 33 days respectively, they were supposed to result in 'critical days' when one or more cycles led to sub- optimal performance, with unfortunate consequences.

25, 26: C. the reason for living beings forming a connection with the Sun's rhythms;

D. the way in which all 'clocks' in a single organism are able to stay in step with one another

Giải thích:

Passage G: But how do all the biochemical 'clocks' inside their cells stay in synchronization and why did organisms bother to acquire a link with sunlight?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27 C

Location: And yet, despite almost frenzied activity, limited progress has been made.

28 A

Location: Many theories to date rely on an assumed association between brain size and language abilities, without acknowledging the problem this creates: fossil evidence indicates that the **Neanderthals*** had larger brains than modern humans, Homo sapiens, but archaeological evidence indicates that the Neanderthals lacked a capacity for language.

29 A

Location: Those authors have an important lesson to learn from Rousseau and other writers of his time who addressed the origin of language.

30 D

Location: Linguist Derek Bickerton has made an important contribution towards our understanding of the origin of language by bringing his profound knowledge of linguistics to the discussions that have occurred. But Bickerton's idea that the precursor of modern language consisted of words strung together with limited, if any, grammar is, I believe, fundamentally mistaken.

31 C

Location: I believe this insight enables us to understand the origin of music as well as language, and to relate both to the emotional lives of our human ancestors.

32 D. Felt that the origin of language should not be debated.

Location: However, the debate became plagued by strange theories, so much so that in 1866 the influential Société de Linguistique de Paris banned all discussions about the origin of language.

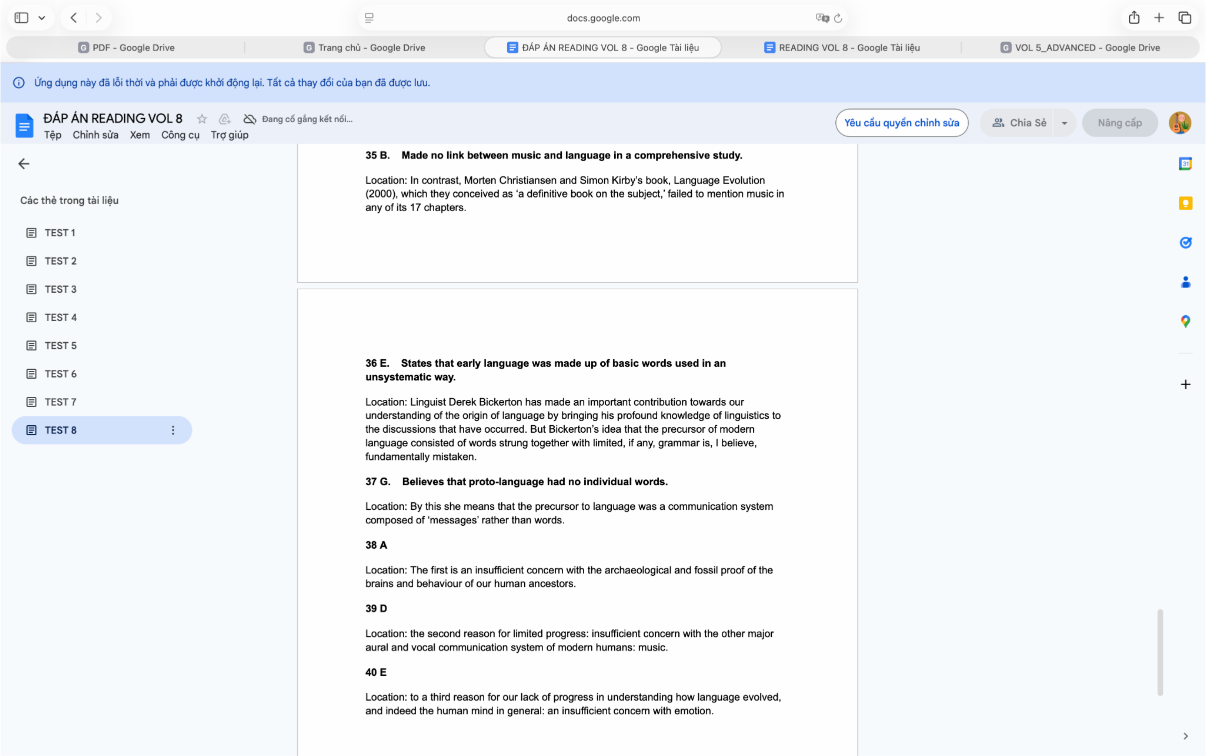
33 H. Referred to music in part of a book about the development of human beings.

Location: However, there are notable exceptions that should be acknowledged. One is the aforementioned Charles Darwin who, in his 1871 book on human evolution, The Descent of Man, devoted several pages to the development of music.

34 A. Suggested music was an essential part of every individual.

Location: Another is the renowned ethnomusicologist John Blacking, whose 1973 book, How Musical is Man?, broached the idea that music is an inherent and universal human quality.

35 B. Made no link between music and language in a comprehensive study.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35 B. Made no link between music and language in a comprehensive study.

Location: In contrast, Morten Christiansen and Simon Kirby's book, Language Evolution (2000), which they conceived as 'a definitive book on the subject,' failed to mention music in any of its 17 chapters.

36 E. States that early language was made up of basic words used in an unsystematic way.

Location: Linguist Derek Bickerton has made an important contribution towards our understanding of the origin of language by bringing his profound knowledge of linguistics to the discussions that have occurred. But Bickerton's idea that the precursor of modern language consisted of words strung together with limited, if any, grammar is, I believe, fundamentally mistaken.

37 G. Believes that proto-language had no individual words.

Location: By this she means that the precursor to language was a communication system composed of 'messages' rather than words.

38 A

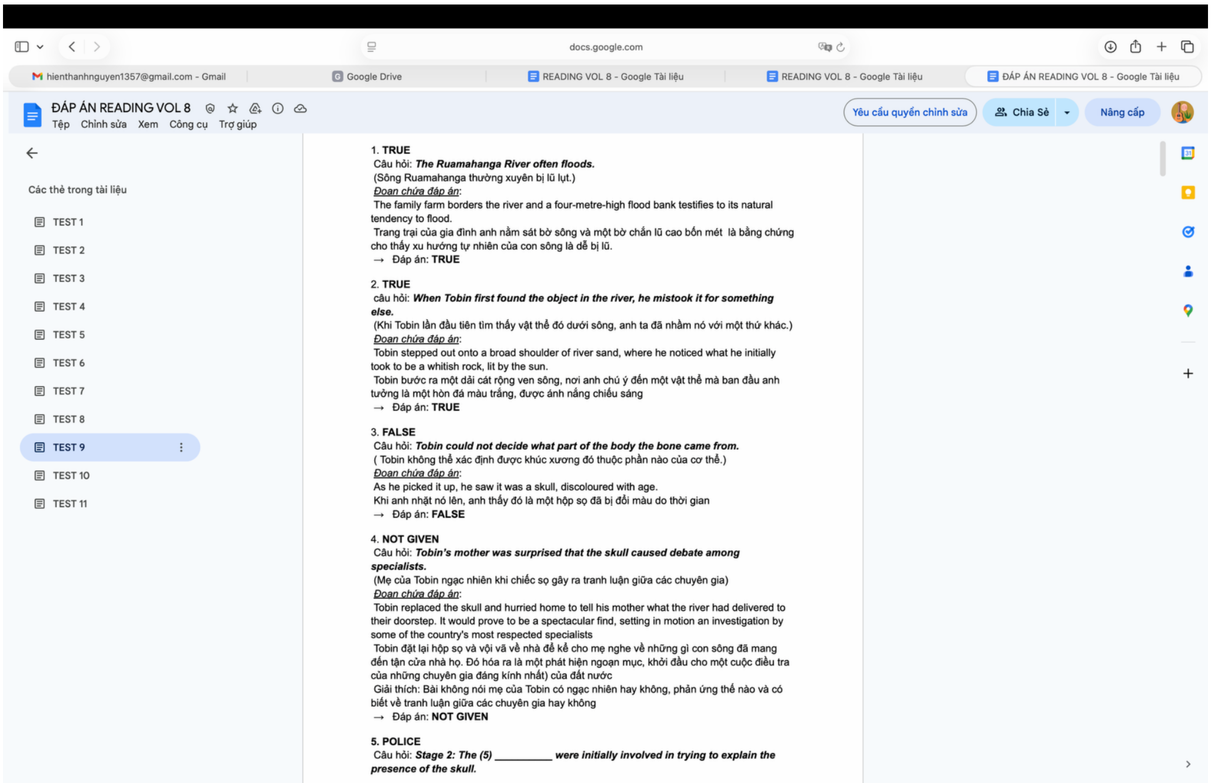
Location: The first is an insufficient concern with the archaeological and fossil proof of the brains and behaviour of our human ancestors.

39 D

Location: the second reason for limited progress: insufficient concern with the other major aural and vocal communication system of modern humans: music.

40 E

Location: to a third reason for our lack of progress in understanding how language evolved, and indeed the human mind in general: an insufficient concern with emotion.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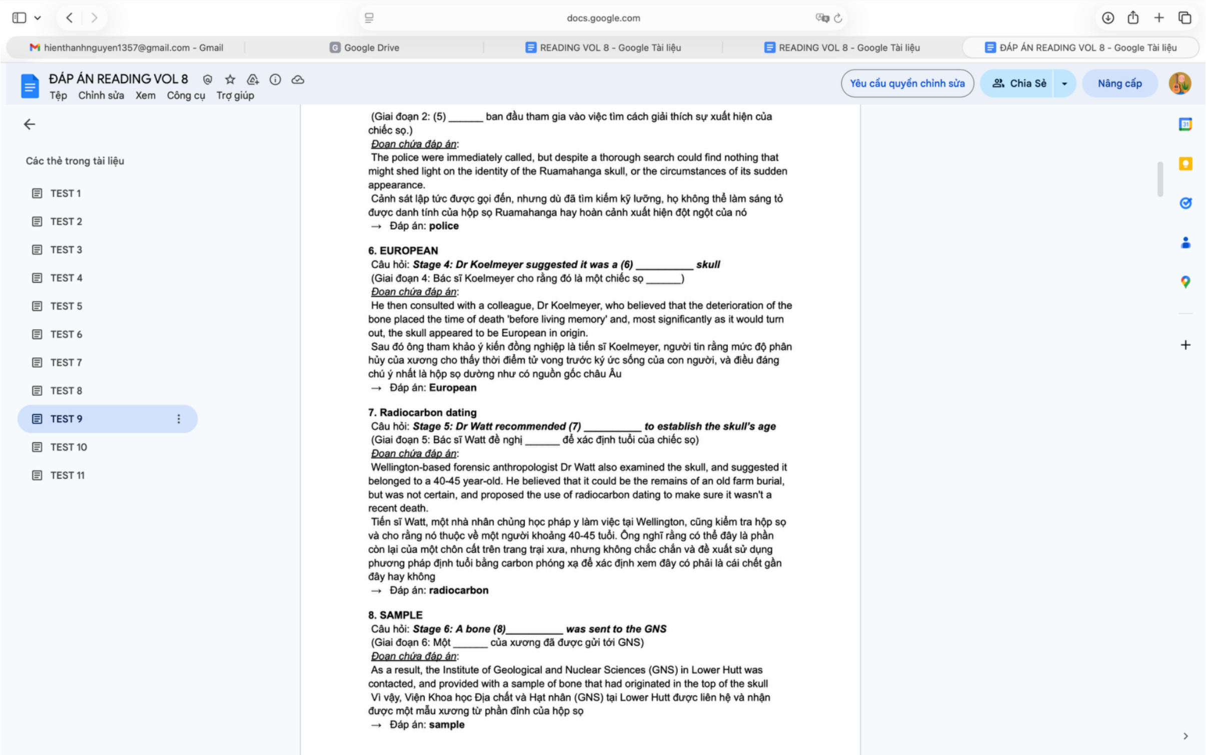
1. **TRUE**
Câu hỏi: ***The Ruamahanga River often floods.***
(Sông Ruamahanga thường xuyên bị lũ lụt.)
Đoạn chứa đáp án:
The family farm borders the river and a four-metre-high flood bank testifies to its natural tendency to flood.
Trang trại của gia đình anh nằm sát bờ sông và một bờ chắn lũ cao bốn mét là bằng chứng cho thấy xu hướng tự nhiên của con sông là dễ bị lũ.
→ Đáp án: **TRUE**

2. **TRUE**
câu hỏi: ***When Tobin first found the object in the river, he mistook it for something else.***
(Khi Tobin lần đầu tiên tìm thấy vật thể đó dưới sông, anh ta đã nhầm nó với một thứ khác.)
Đoạn chứa đáp án:
Tobin stepped out onto a broad shoulder of river sand, where he noticed what he initially took to be a whitish rock, lit by the sun.
Tobin bước ra một dải cát rộng ven sông, nơi anh chú ý đến một vật thể mà ban đầu anh tưởng là một hòn đá màu trắng, được ánh nắng chiếu sáng
→ Đáp án: **TRUE**

3. **FALSE**
Câu hỏi: ***Tobin could not decide what part of the body the bone came from.***
(Tobin không thể xác định được khúc xương đó thuộc phần nào của cơ thể.)
Đoạn chứa đáp án:
As he picked it up, he saw it was a skull, discoloured with age.
Khi anh nhặt nó lên, anh thấy đó là một hộp sọ đã bị đổi màu do thời gian
→ Đáp án: **FALSE**

4. **NOT GIVEN**
Câu hỏi: ***Tobin's mother was surprised that the skull caused debate among specialists.***
(Mẹ của Tobin ngạc nhiên khi chiếc sọ gây ra tranh luận giữa các chuyên gia)
Đoạn chứa đáp án:
Tobin replaced the skull and hurried home to tell his mother what the river had delivered to their doorstep. It would prove to be a spectacular find, setting in motion an investigation by some of the country's most respected specialists
Tobin đặt lại hộp sọ và vội vã về nhà để kể cho mẹ nghe về những gì con sông đã mang đến tận cửa nhà họ. Đó hóa ra là một phát hiện ngoạn mục, khởi đầu cho một cuộc điều tra của những chuyên gia đáng kính nhất) của đất nước
Giải thích: Bài không nói mẹ của Tobin có ngạc nhiên hay không, phản ứng thế nào và có biết về tranh luận giữa các chuyên gia hay không
→ Đáp án: **NOT GIVEN**

5. POLICE
Câu hỏi: ***Stage 2: The (5) __________ were initially involved in trying to explain the presence of the skull.***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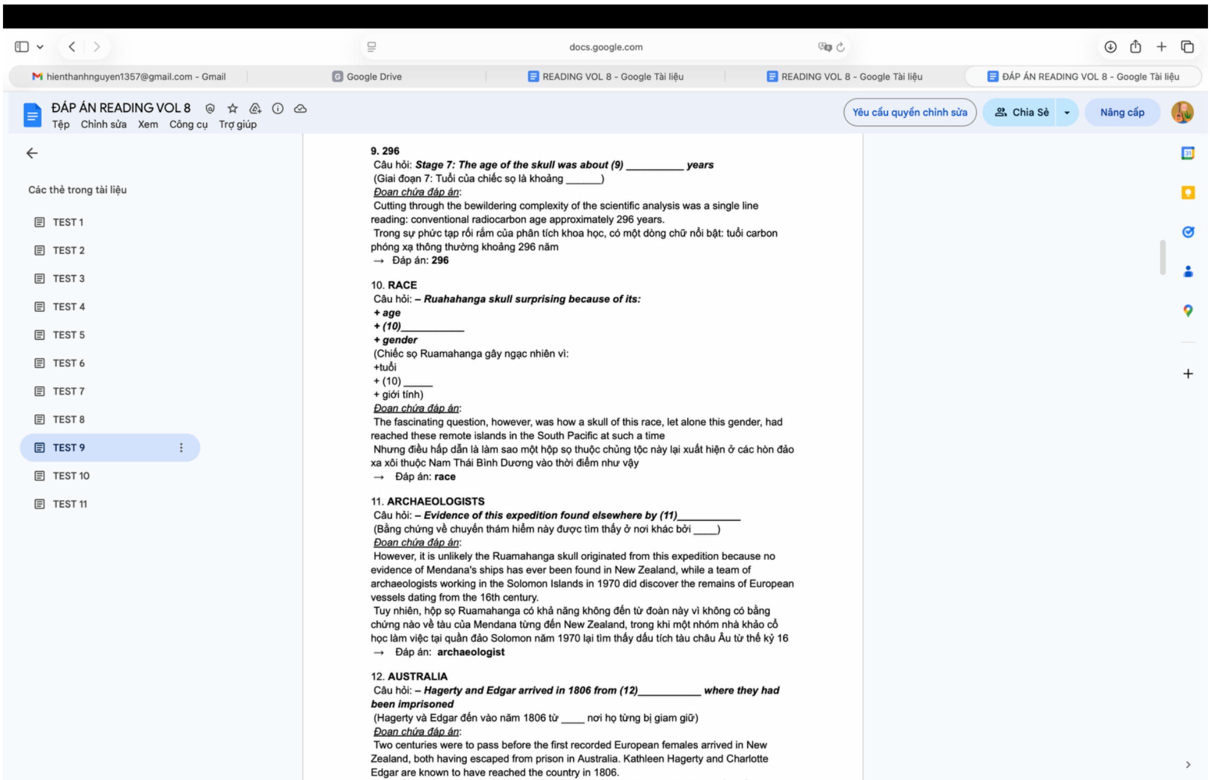
(Giai đoạn 2: (5) ______ ban đầu tham gia vào việc tìm cách giải thích sự xuất hiện của chiếc sọ.)
Đoạn chứa đáp án:
The police were immediately called, but despite a thorough search could find nothing that might shed light on the identity of the Ruamahanga skull, or the circumstances of its sudden appearance.
Cảnh sát lập tức được gọi đến, nhưng dù đã tìm kiếm kỹ lưỡng, họ không thể làm sáng tỏ được danh tính của hộp sọ Ruamahanga hay hoàn cảnh xuất hiện đột ngột của nó
→ Đáp án: **police**

6. EUROPEAN
Câu hỏi: ***Stage 4: Dr Koelmeyer suggested it was a (6) __________ skull***
(Giai đoạn 4: Bác sĩ Koelmeyer cho rằng đó là một chiếc sọ ______)
Đoạn chứa đáp án:
He then consulted with a colleague, Dr Koelmeyer, who believed that the deterioration of the bone placed the time of death 'before living memory' and, most significantly as it would turn out, the skull appeared to be European in origin.
Sau đó ông tham khảo ý kiến đồng nghiệp là tiến sĩ Koelmeyer, người tin rằng mức độ phân hủy của xương cho thấy thời điểm tử vong trước ký ức sống của con người, và điều đáng chú ý nhất là hộp sọ dường như có nguồn gốc châu Âu
→ Đáp án: **European**

7. Radiocarbon dating
Câu hỏi: ***Stage 5: Dr Watt recommended (7) __________ to establish the skull's age***
(Giai đoạn 5: Bác sĩ Watt đề nghị ______ để xác định tuổi của chiếc sọ)
Đoạn chứa đáp án:
Wellington-based forensic anthropologist Dr Watt also examined the skull, and suggested it belonged to a 40-45 year-old. He believed that it could be the remains of an old farm burial, but was not certain, and proposed the use of radiocarbon dating to make sure it wasn't a recent death.
Tiến sĩ Watt, một nhà nhân chủng học pháp y làm việc tại Wellington, cũng kiểm tra hộp sọ và cho rằng nó thuộc về một người khoảng 40-45 tuổi. Ông nghĩ rằng có thể đây là phần còn lại của một chôn cất trên trang trại xưa, nhưng không chắc chắn và đề xuất sử dụng phương pháp định tuổi bằng carbon phóng xạ để xác định xem đây có phải là cái chết gần đây hay không
→ Đáp án: **radiocarbon**

8. SAMPLE
Câu hỏi: ***Stage 6: A bone (8)__________ was sent to the GNS***
(Giai đoạn 6: Một ______ của xương đã được gửi tới GNS)
Đoạn chứa đáp án:
As a result, the Institute of Geological and Nuclear Sciences (GNS) in Lower Hutt was contacted, and provided with a sample of bone that had originated in the top of the skull
Vì vậy, Viện Khoa học Địa chất và Hạt nhân (GNS) tại Lower Hutt được liên hệ và nhận được một mẫu xương từ phần đỉnh của hộp sọ
→ Đáp án: **sample**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9. 296

Câu hỏi: ***Stage 7: The age of the skull was about (9) __________ years***

(Giai đoạn 7: Tuổi của chiếc sọ là khoảng ______)

Đoạn chứa đáp án:

Cutting through the bewildering complexity of the scientific analysis was a single line reading: conventional radiocarbon age approximately 296 years.

Trong sự phức tạp rối rắm của phân tích khoa học, có một dòng chữ nổi bật: tuổi carbon phóng xạ thông thường khoảng 296 năm

→ Đáp án: **296**

10. **RACE**

Câu hỏi: **– *Ruahahanga skull surprising because of its:***

+ age

+ (10)___________

+ gender

(Chiếc sọ Ruamahanga gây ngạc nhiên vì:
+tuổi
+ (10) _____
+ giới tính)

Đoạn chứa đáp án:

The fascinating question, however, was how a skull of this race, let alone this gender, had reached these remote islands in the South Pacific at such a time

Nhưng điều hấp dẫn là làm sao một hộp sọ thuộc chủng tộc này lại xuất hiện ở các hòn đảo xa xôi thuộc Nam Thái Bình Dương vào thời điểm như vậy

→ Đáp án: **race**

11. **ARCHAEOLOGISTS**

Câu hỏi: **– *Evidence of this expedition found elsewhere by (11)___________***

(Bằng chứng về chuyến thám hiểm này được tìm thấy ở nơi khác bởi ____)

Đoạn chứa đáp án:

However, it is unlikely the Ruamahanga skull originated from this expedition because no evidence of Mendana's ships has ever been found in New Zealand, while a team of archaeologists working in the Solomon Islands in 1970 did discover the remains of European vessels dating from the 16th century.

Tuy nhiên, hộp sọ Ruamahanga có khả năng không đến từ đoàn này vì không có bằng chứng nào về tàu của Mendana từng đến New Zealand, trong khi một nhóm nhà khảo cổ học làm việc tại quần đảo Solomon năm 1970 lại tìm thấy dấu tích tàu châu Âu từ thế kỷ 16

→ Đáp án: **archaeologist**

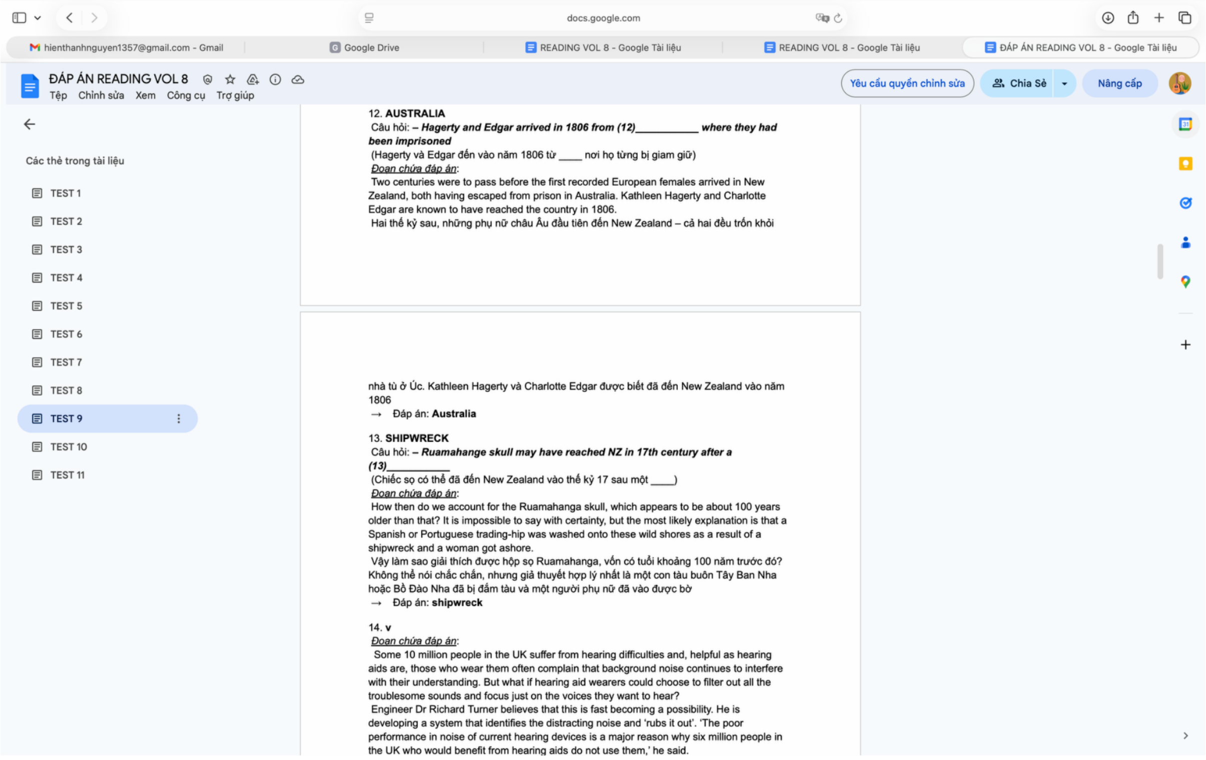
12. **AUSTRALIA**

Câu hỏi: **– *Hagerty and Edgar arrived in 1806 from (12)___________ where they had been imprisoned***

(Hagerty và Edgar đến vào năm 1806 từ ____ nơi họ từng bị giam giữ)

Đoạn chứa đáp án:

Two centuries were to pass before the first recorded European females arrived in New Zealand, both having escaped from prison in Australia. Kathleen Hagerty and Charlotte Edgar are known to have reached the country in 1806.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Two centuries were to pass before the first recorded European females arrived in New Zealand, both having escaped from prison in Australia. Kathleen Hagerty and Charlotte Edgar are known to have reached the country in 1806.

Hai thế kỷ sau, những phụ nữ châu Âu đầu tiên đến New Zealand – cả hai đều trốn khỏi nhà tù ở Úc. Kathleen Hagerty và Charlotte Edgar được biết đã đến New Zealand vào năm 1806

→ Đáp án: **Australia**

13. **SHIPWRECK**

Câu hỏi: **– *Ruamahange skull may have reached NZ in 17th century after a (13)___________***

(Chiếc sọ có thể đã đến New Zealand vào thế kỷ 17 sau một ____)

Đoạn chứa đáp án:

How then do we account for the Ruamahanga skull, which appears to be about 100 years older than that? It is impossible to say with certainty, but the most likely explanation is that a Spanish or Portuguese trading-hip was washed onto these wild shores as a result of a shipwreck and a woman got ashore.

Vậy làm sao giải thích được hộp sọ Ruamahanga, vốn có tuổi khoảng 100 năm trước đó? Không thể nói chắc chắn, nhưng giả thuyết hợp lý nhất là một con tàu buôn Tây Ban Nha hoặc Bồ Đào Nha đã bị đắm tàu và một người phụ nữ đã vào được bờ

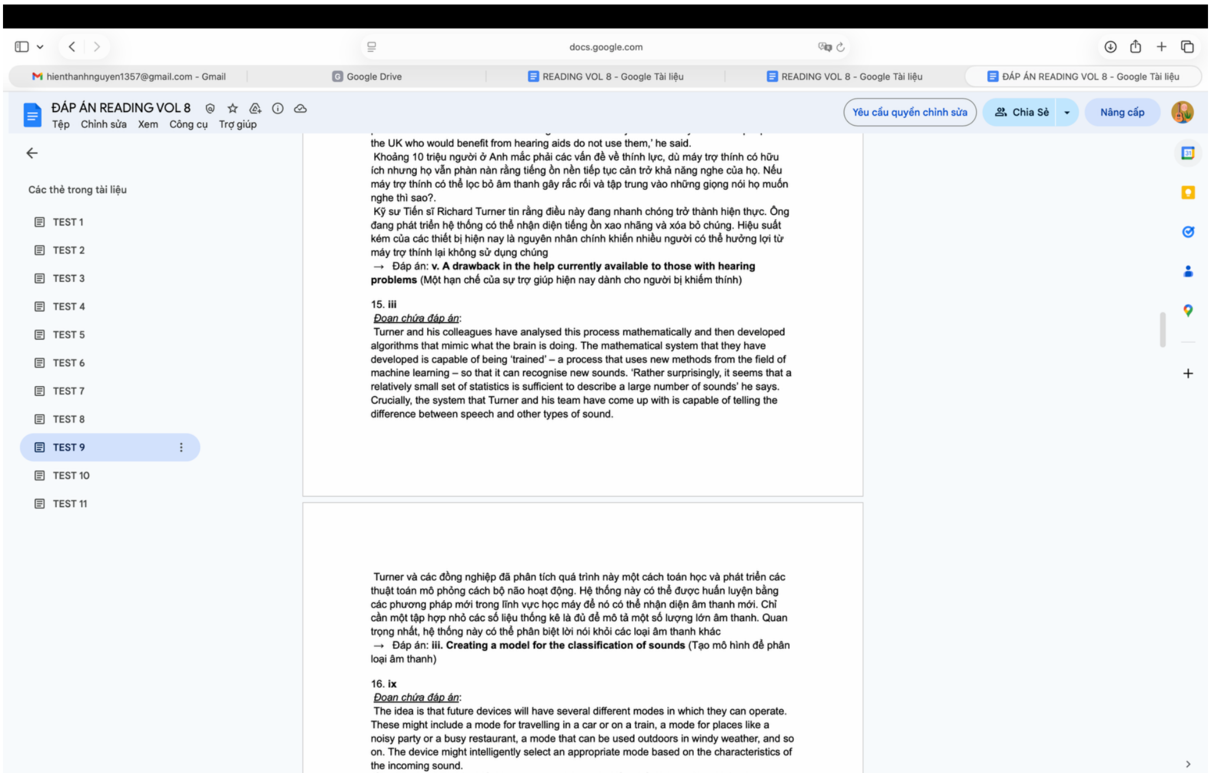
→ Đáp án: **shipwreck**

14. **v**

Đoạn chứa đáp án:

Some 10 million people in the UK suffer from hearing difficulties and, helpful as hearing aids are, those who wear them often complain that background noise continues to interfere with their understanding. But what if hearing aid wearers could choose to filter out all the troublesome sounds and focus just on the voices they want to hear?

Engineer Dr Richard Turner believes that this is fast becoming a possibility. He is developing a system that identifies the distracting noise and 'rubs it out'. 'The poor performance in noise of current hearing devices is a major reason why six million people in the UK who would benefit from hearing aids do not use them,' he said.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the UK who would benefit from hearing aids do not use them,' he said.

Khoảng 10 triệu người ở Anh mắc phải các vấn đề về thính lực, dù máy trợ thính có hữu ích nhưng họ vẫn phàn nàn rằng tiếng ồn nền tiếp tục cản trở khả năng nghe của họ. Nếu máy trợ thính có thể lọc bỏ âm thanh gây rắc rối và tập trung vào những giọng nói họ muốn nghe thì sao?.

Kỹ sư Tiến sĩ Richard Turner tin rằng điều này đang nhanh chóng trở thành hiện thực. Ông đang phát triển hệ thống có thể nhận diện tiếng ồn xao nhãng và xóa bỏ chúng. Hiệu suất kém của các thiết bị hiện nay là nguyên nhân chính khiến nhiều người có thể hưởng lợi từ máy trợ thính lại không sử dụng chúng

→ Đáp án: **v. A drawback in the help currently available to those with hearing problems** (Một hạn chế của sự trợ giúp hiện nay dành cho người bị khiếm thính)

15. **iii**

Đoạn chứa đáp án:

Turner and his colleagues have analysed this process mathematically and then developed algorithms that mimic what the brain is doing. The mathematical system that they have developed is capable of being 'trained' – a process that uses new methods from the field of machine learning – so that it can recognise new sounds. 'Rather surprisingly, it seems that a relatively small set of statistics is sufficient to describe a large number of sounds' he says. Crucially, the system that Turner and his team have come up with is capable of telling the difference between speech and other types of sound.

Turner và các đồng nghiệp đã phân tích quá trình này một cách toán học và phát triển các thuật toán mô phỏng cách bộ não hoạt động. Hệ thống này có thể được huấn luyện bằng các phương pháp mới trong lĩnh vực học máy để nó có thể nhận diện âm thanh mới. Chỉ cần một tập hợp nhỏ các số liệu thống kê là đủ để mô tả một số lượng lớn âm thanh. Quan trọng nhất, hệ thống này có thể phân biệt lời nói khỏi các loại âm thanh khác

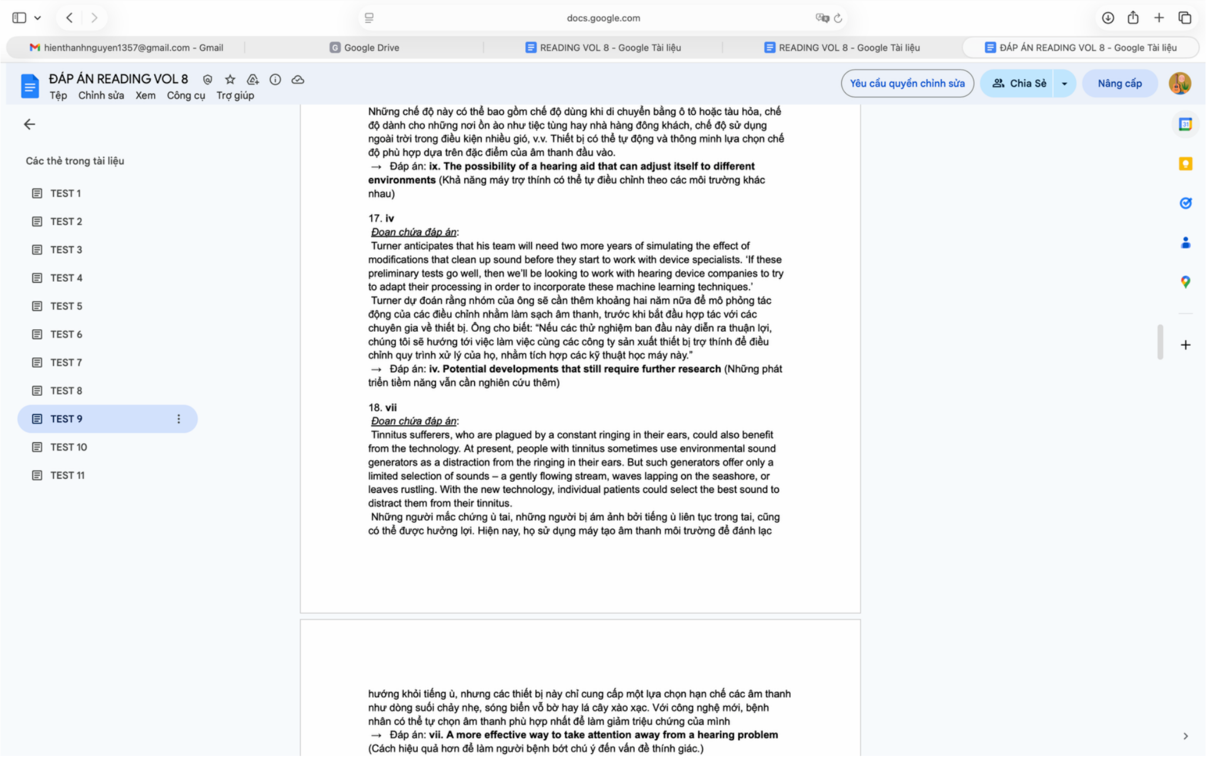
→ Đáp án: **iii. Creating a model for the classification of sounds** (Tạo mô hình để phân loại âm thanh)

16. **ix**

Đoạn chứa đáp án:

The idea is that future devices will have several different modes in which they can operate. These might include a mode for travelling in a car or on a train, a mode for places like a noisy party or a busy restaurant, a mode that can be used outdoors in windy weather, and so on. The device might intelligently select an appropriate mode based on the characteristics of the incoming sound.

Ý tưởng ở đây là các thiết bị trong tương lai sẽ có nhiều chế độ hoạt động khác nhau.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Những chế độ này có thể bao gồm chế độ dùng khi di chuyển bằng ô tô hoặc tàu hỏa, chế độ dành cho những nơi ồn ào như tiệc tùng hay nhà hàng đông khách, chế độ sử dụng ngoài trời trong điều kiện nhiều gió, v.v. Thiết bị có thể tự động và thông minh lựa chọn chế độ phù hợp dựa trên đặc điểm của âm thanh đầu vào.

→ Đáp án: **ix. The possibility of a hearing aid that can adjust itself to different environments** (Khả năng máy trợ thính có thể tự điều chỉnh theo các môi trường khác nhau)

17. **iv**

Đoạn chứa đáp án:

Turner anticipates that his team will need two more years of simulating the effect of modifications that clean up sound before they start to work with device specialists. 'If these preliminary tests go well, then we'll be looking to work with hearing device companies to try to adapt their processing in order to incorporate these machine learning techniques.'

Turner dự đoán rằng nhóm của ông sẽ cần thêm khoảng hai năm nữa để mô phỏng tác động của các điều chỉnh nhằm làm sạch âm thanh, trước khi bắt đầu hợp tác với các chuyên gia về thiết bị. Ông cho biết: "Nếu các thử nghiệm ban đầu này diễn ra thuận lợi, chúng tôi sẽ hướng tới việc làm việc cùng các công ty sản xuất thiết bị trợ thính để điều chỉnh quy trình xử lý của họ, nhằm tích hợp các kỹ thuật học máy này."

→ Đáp án: **iv. Potential developments that still require further research** (Những phát triển tiềm năng vẫn cần nghiên cứu thêm)

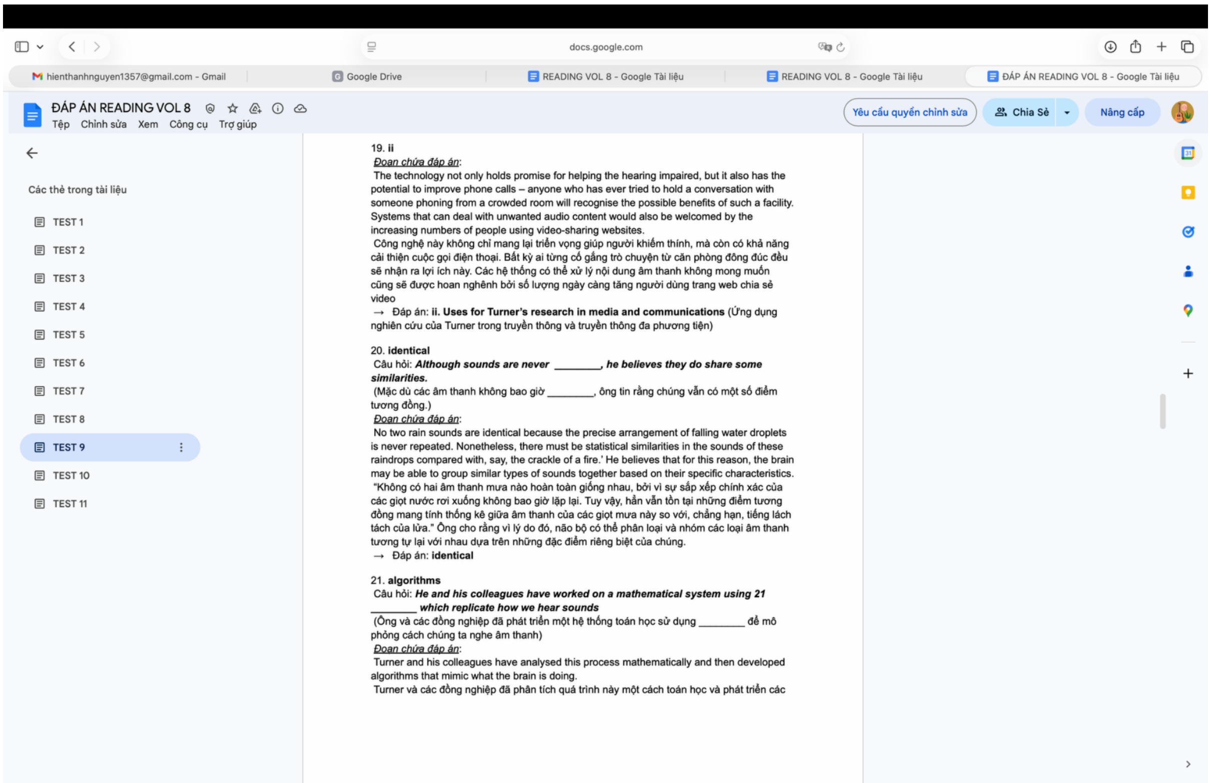
18. **vii**

Đoạn chứa đáp án:

Tinnitus sufferers, who are plagued by a constant ringing in their ears, could also benefit from the technology. At present, people with tinnitus sometimes use environmental sound generators as a distraction from the ringing in their ears. But such generators offer only a limited selection of sounds – a gently flowing stream, waves lapping on the seashore, or leaves rustling. With the new technology, individual patients could select the best sound to distract them from their tinnitus.

Những người mắc chứng ù tai, những người bị ám ảnh bởi tiếng ù liên tục trong tai, cũng có thể được hưởng lợi. Hiện nay, họ sử dụng máy tạo âm thanh môi trường để đánh lạc hướng khỏi tiếng ù, nhưng các thiết bị này chỉ cung cấp một lựa chọn hạn chế các âm thanh như dòng suối chảy nhẹ, sóng biển vỗ bờ hay lá cây xào xạc. Với công nghệ mới, bệnh nhân có thể tự chọn âm thanh phù hợp nhất để làm giảm triệu chứng của mình

→ Đáp án: **vii. A more effective way to take attention away from a hearing problem** (Cách hiệu quả hơn để làm người bệnh bớt chú ý đến vấn đề thính giác.)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19. **ii**

Đoạn chứa đáp án:

The technology not only holds promise for helping the hearing impaired, but it also has the potential to improve phone calls – anyone who has ever tried to hold a conversation with someone phoning from a crowded room will recognise the possible benefits of such a facility. Systems that can deal with unwanted audio content would also be welcomed by the increasing numbers of people using video-sharing websites.

Công nghệ này không chỉ mang lại triển vọng giúp người khiếm thính, mà còn có khả năng cải thiện cuộc gọi điện thoại. Bất kỳ ai từng cố gắng trò chuyện từ căn phòng đông đúc đều sẽ nhận ra lợi ích này. Các hệ thống có thể xử lý nội dung âm thanh không mong muốn cũng sẽ được hoan nghênh bởi số lượng ngày càng tăng người dùng trang web chia sẻ video

→ Đáp án: **ii. Uses for Turner's research in media and communications** (Ứng dụng nghiên cứu của Turner trong truyền thông và truyền thông đa phương tiện)

20. **identical**

Câu hỏi: ***Although sounds are never ________, he believes they do share some similarities.***

(Mặc dù các âm thanh không bao giờ ________, ông tin rằng chúng vẫn có một số điểm tương đồng.)

Đoạn chứa đáp án:

No two rain sounds are identical because the precise arrangement of falling water droplets is never repeated. Nonetheless, there must be statistical similarities in the sounds of these raindrops compared with, say, the crackle of a fire.' He believes that for this reason, the brain may be able to group similar types of sounds together based on their specific characteristics.

"Không có hai âm thanh mưa nào hoàn toàn giống nhau, bởi vì sự sắp xếp chính xác của các giọt nước rơi xuống không bao giờ lặp lại. Tuy vậy, hẳn vẫn tồn tại những điểm tương đồng mang tính thống kê giữa âm thanh của các giọt mưa này so với, chẳng hạn, tiếng lách tách của lửa." Ông cho rằng vì lý do đó, não bộ có thể phân loại và nhóm các loại âm thanh tương tự lại với nhau dựa trên những đặc điểm riêng biệt của chúng.

→ Đáp án: **identical**

21. **algorithms**

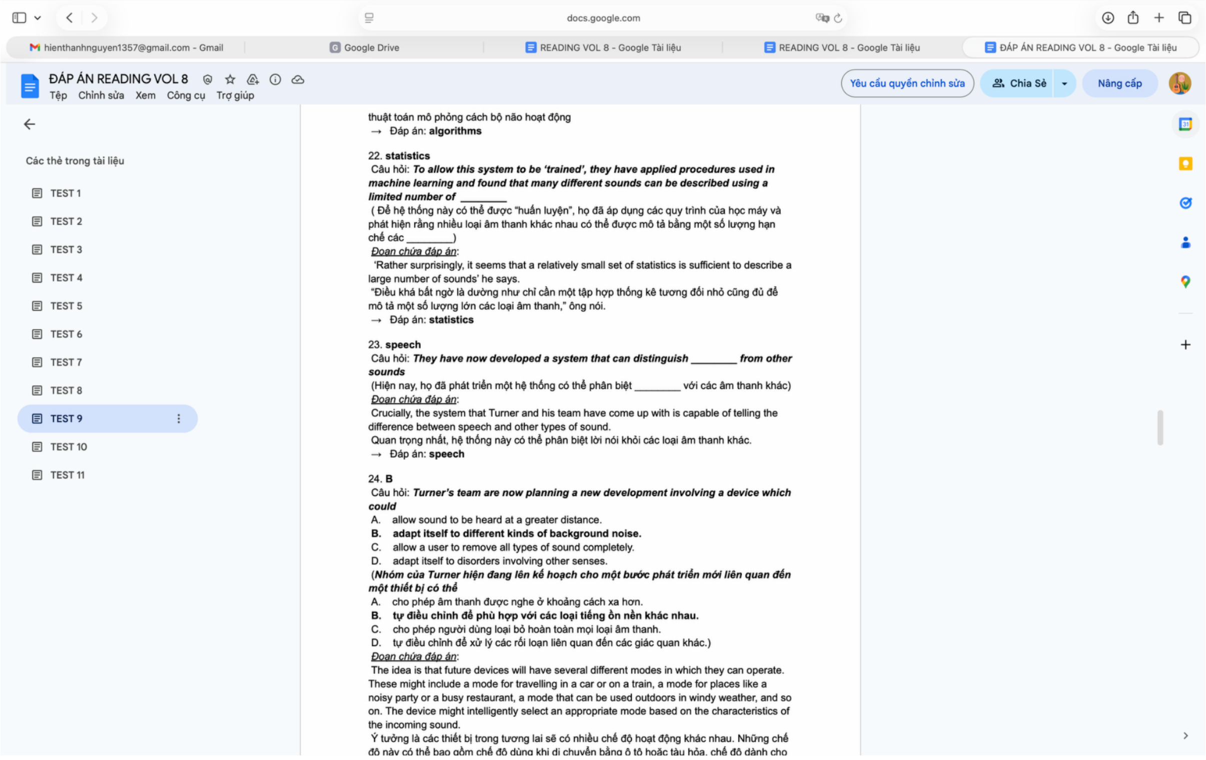
Câu hỏi: ***He and his colleagues have worked on a mathematical system using 21 ________ which replicate how we hear sounds***

(Ông và các đồng nghiệp đã phát triển một hệ thống toán học sử dụng ________ để mô phỏng cách chúng ta nghe âm thanh)

Đoạn chứa đáp án:

Turner and his colleagues have analysed this process mathematically and then developed algorithms that mimic what the brain is doing.

Turner và các đồng nghiệp đã phân tích quá trình này một cách toán học và phát triển các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thuật toán mô phỏng cách bộ não hoạt động

→ Đáp án: **algorithms**

22. **statistics**

Câu hỏi: ***To allow this system to be 'trained', they have applied procedures used in machine learning and found that many different sounds can be described using a limited number of ________***

(Để hệ thống này có thể được "huấn luyện", họ đã áp dụng các quy trình của học máy và phát hiện rằng nhiều loại âm thanh khác nhau có thể được mô tả bằng một số lượng hạn chế các ________)

Đoạn chứa đáp án:

'Rather surprisingly, it seems that a relatively small set of statistics is sufficient to describe a large number of sounds' he says.

"Điều khá bất ngờ là dường như chỉ cần một tập hợp thống kê tương đối nhỏ cũng đủ để mô tả một số lượng lớn các loại âm thanh," ông nói.

→ Đáp án: **statistics**

23. **speech**

Câu hỏi: ***They have now developed a system that can distinguish ________ from other sounds***

(Hiện nay, họ đã phát triển một hệ thống có thể phân biệt ________ với các âm thanh khác)

Đoạn chứa đáp án:

Crucially, the system that Turner and his team have come up with is capable of telling the difference between speech and other types of sound.

Quan trọng nhất, hệ thống này có thể phân biệt lời nói khỏi các loại âm thanh khác.

→ Đáp án: **speech**

24. **B**

Câu hỏi: ***Turner's team are now planning a new development involving a device which could***

A. allow sound to be heard at a greater distance.
B. adapt itself to different kinds of background noise.
C. allow a user to remove all types of sound completely.
D. adapt itself to disorders involving other senses.

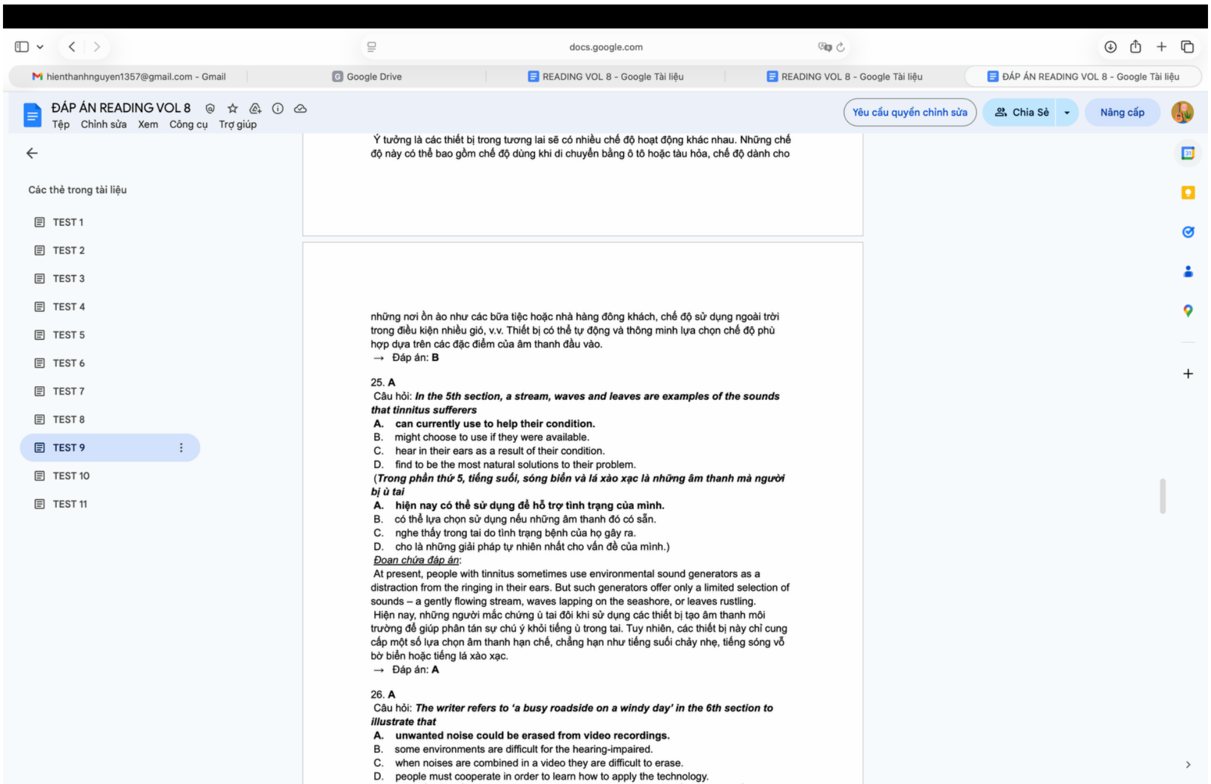
(***Nhóm của Turner hiện đang lên kế hoạch cho một bước phát triển mới liên quan đến một thiết bị có thể***

A. cho phép âm thanh được nghe ở khoảng cách xa hơn.
B. tự điều chỉnh để phù hợp với các loại tiếng ồn nền khác nhau.
C. cho phép người dùng loại bỏ hoàn toàn mọi loại âm thanh.
D. tự điều chỉnh để xử lý các rối loạn liên quan đến các giác quan khác.)

Đoạn chứa đáp án:

The idea is that future devices will have several different modes in which they can operate. These might include a mode for travelling in a car or on a train, a mode for places like a noisy party or a busy restaurant, a mode that can be used outdoors in windy weather, and so on. The device might intelligently select an appropriate mode based on the characteristics of the incoming sound.

Ý tưởng là các thiết bị trong tương lai sẽ có nhiều chế độ hoạt động khác nhau. Những chế độ này có thể bao gồm chế độ dùng khi di chuyển bằng ô tô hoặc tàu hỏa, chế độ dành cho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Ý tưởng là các thiết bị trong tương lai sẽ có nhiều chế độ hoạt động khác nhau. Những chế độ này có thể bao gồm chế độ dùng khi di chuyển bằng ô tô hoặc tàu hỏa, chế độ dành cho những nơi ồn ào như các bữa tiệc hoặc nhà hàng đông khách, chế độ sử dụng ngoài trời trong điều kiện nhiều gió, v.v. Thiết bị có thể tự động và thông minh lựa chọn chế độ phù hợp dựa trên các đặc điểm của âm thanh đầu vào.

→ Đáp án: **B**

25. **A**

Câu hỏi: ***In the 5th section, a stream, waves and leaves are examples of the sounds that tinnitus sufferers***

A. can currently use to help their condition.
B. might choose to use if they were available.
C. hear in their ears as a result of their condition.
D. find to be the most natural solutions to their problem.

(***Trong phần thứ 5, tiếng suối, sóng biển và lá xào xạc là những âm thanh mà người bị ù tai***

A. hiện nay có thể sử dụng để hỗ trợ tình trạng của mình.
B. có thể lựa chọn sử dụng nếu những âm thanh đó có sẵn.
C. nghe thấy trong tai do tình trạng bệnh của họ gây ra.
D. cho là những giải pháp tự nhiên nhất cho vấn đề của mình.)

Đoạn chứa đáp án:

At present, people with tinnitus sometimes use environmental sound generators as a distraction from the ringing in their ears. But such generators offer only a limited selection of sounds – a gently flowing stream, waves lapping on the seashore, or leaves rustling.

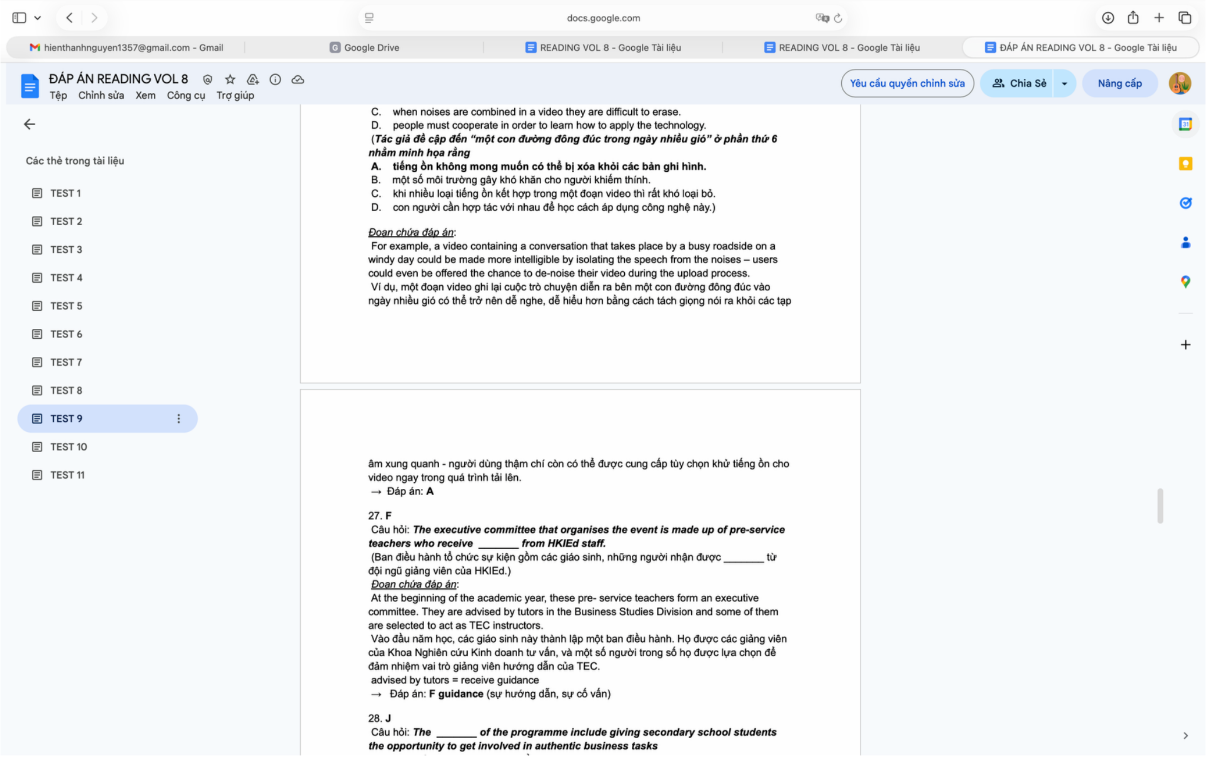
Hiện nay, những người mắc chứng ù tai đôi khi sử dụng các thiết bị tạo âm thanh môi trường để giúp phân tán sự chú ý khỏi tiếng ù trong tai. Tuy nhiên, các thiết bị này chỉ cung cấp một số lựa chọn âm thanh hạn chế, chẳng hạn như tiếng suối chảy nhẹ, tiếng sóng vỗ bờ biển hoặc tiếng lá xào xạc.

→ Đáp án: **A**

26. **A**

Câu hỏi: ***The writer refers to 'a busy roadside on a windy day' in the 6th section to illustrate that***

A. unwanted noise could be erased from video recordings.
B. some environments are difficult for the hearing-impaired.
C. when noises are combined in a video they are difficult to erase.
D. people must cooperate in order to learn how to apply the technology.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C. when noises are combined in a video they are difficult to erase.
D. people must cooperate in order to learn how to apply the technology.

(***Tác giả đề cập đến "một con đường đông đúc trong ngày nhiều gió" ở phần thứ 6 nhằm minh họa rằng***

A. tiếng ồn không mong muốn có thể bị xóa khỏi các bản ghi hình.
B. một số môi trường gây khó khăn cho người khiếm thính.
C. khi nhiều loại tiếng ồn kết hợp trong một đoạn video thì rất khó loại bỏ.
D. con người cần hợp tác với nhau để học cách áp dụng công nghệ này.)

Đoạn chứa đáp án:

For example, a video containing a conversation that takes place by a busy roadside on a windy day could be made more intelligible by isolating the speech from the noises – users could even be offered the chance to de-noise their video during the upload process.

Ví dụ, một đoạn video ghi lại cuộc trò chuyện diễn ra bên một con đường đông đúc vào ngày nhiều gió có thể trở nên dễ nghe, dễ hiểu hơn bằng cách tách giọng nói ra khỏi các tạp âm xung quanh - người dùng thậm chí còn có thể được cung cấp tùy chọn khử tiếng ồn cho video ngay trong quá trình tải lên.

→ Đáp án: **A**

27. **F**

Câu hỏi: ***The executive committee that organises the event is made up of pre-service teachers who receive _______ from HKIEd staff.***

(Ban điều hành tổ chức sự kiện gồm các giáo sinh, những người nhận được _______ từ đội ngũ giảng viên của HKIEd.)

Đoạn chứa đáp án:

At the beginning of the academic year, these pre- service teachers form an executive committee. They are advised by tutors in the Business Studies Division and some of them are selected to act as TEC instructors.

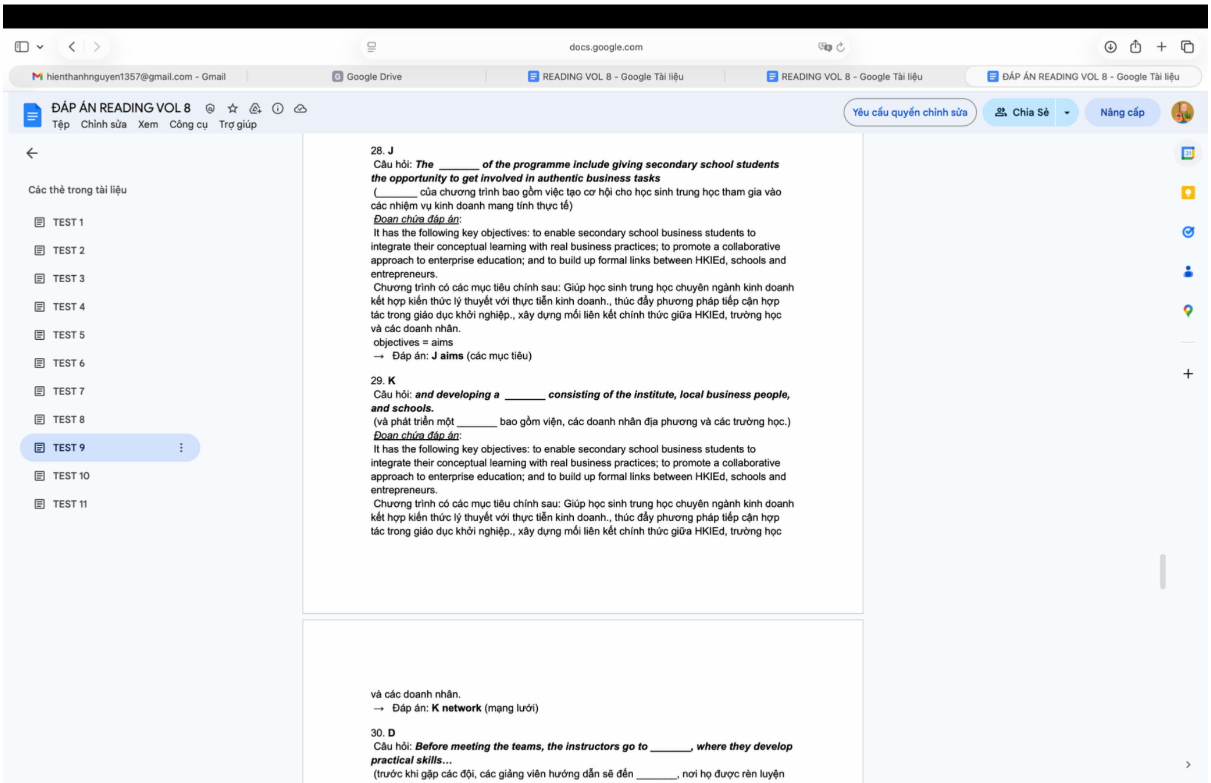
Vào đầu năm học, các giáo sinh này thành lập một ban điều hành. Họ được các giảng viên của Khoa Nghiên cứu Kinh doanh tư vấn, và một số người trong số họ được lựa chọn để đảm nhiệm vai trò giảng viên hướng dẫn của TEC.

advised by tutors = receive guidance

→ Đáp án: **F guidance** (sự hướng dẫn, sự cố vấn)

28. **J**

Câu hỏi: ***The _______ of the programme include giving secondary school students the opportunity to get involved in authentic business tasks***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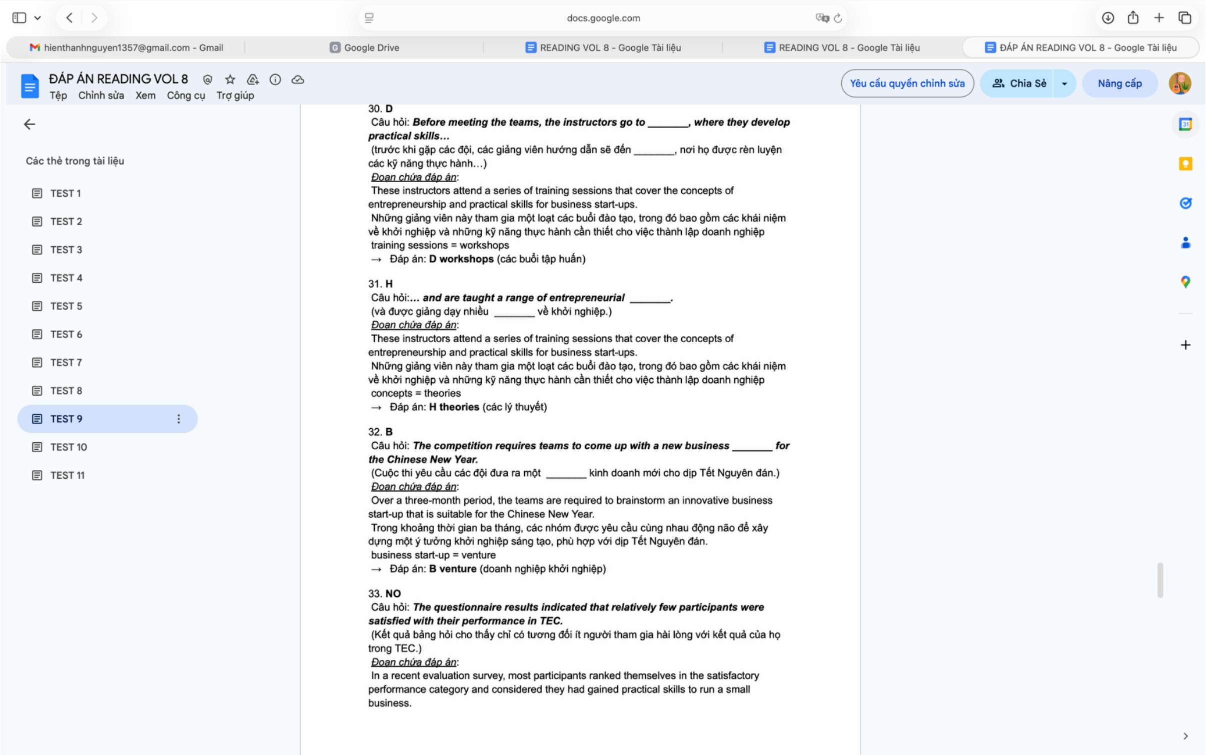
28. **J**
Câu hỏi: ***The _______ of the programme include giving secondary school students the opportunity to get involved in authentic business tasks***
(_______ của chương trình bao gồm việc tạo cơ hội cho học sinh trung học tham gia vào các nhiệm vụ kinh doanh mang tính thực tế)
Đoạn chứa đáp án:
It has the following key objectives: to enable secondary school business students to integrate their conceptual learning with real business practices; to promote a collaborative approach to enterprise education; and to build up formal links between HKIEd, schools and entrepreneurs.
Chương trình có các mục tiêu chính sau: Giúp học sinh trung học chuyên ngành kinh doanh kết hợp kiến thức lý thuyết với thực tiễn kinh doanh., thúc đẩy phương pháp tiếp cận hợp tác trong giáo dục khởi nghiệp., xây dựng mối liên kết chính thức giữa HKIEd, trường học và các doanh nhân.
objectives = aims
→ Đáp án: **J aims** (các mục tiêu)

29. **K**
Câu hỏi: ***and developing a _______ consisting of the institute, local business people, and schools.***
(và phát triển một _______ bao gồm viện, các doanh nhân địa phương và các trường học.)
Đoạn chứa đáp án:
It has the following key objectives: to enable secondary school business students to integrate their conceptual learning with real business practices; to promote a collaborative approach to enterprise education; and to build up formal links between HKIEd, schools and entrepreneurs.
Chương trình có các mục tiêu chính sau: Giúp học sinh trung học chuyên ngành kinh doanh kết hợp kiến thức lý thuyết với thực tiễn kinh doanh., thúc đẩy phương pháp tiếp cận hợp tác trong giáo dục khởi nghiệp., xây dựng mối liên kết chính thức giữa HKIEd, trường học và các doanh nhân.
→ Đáp án: **K network** (mạng lưới)

30. **D**
Câu hỏi: ***Before meeting the teams, the instructors go to _______, where they develop practical skills…***
(trước khi gặp các đội, các giảng viên hướng dẫn sẽ đến _______, nơi họ được rèn luyện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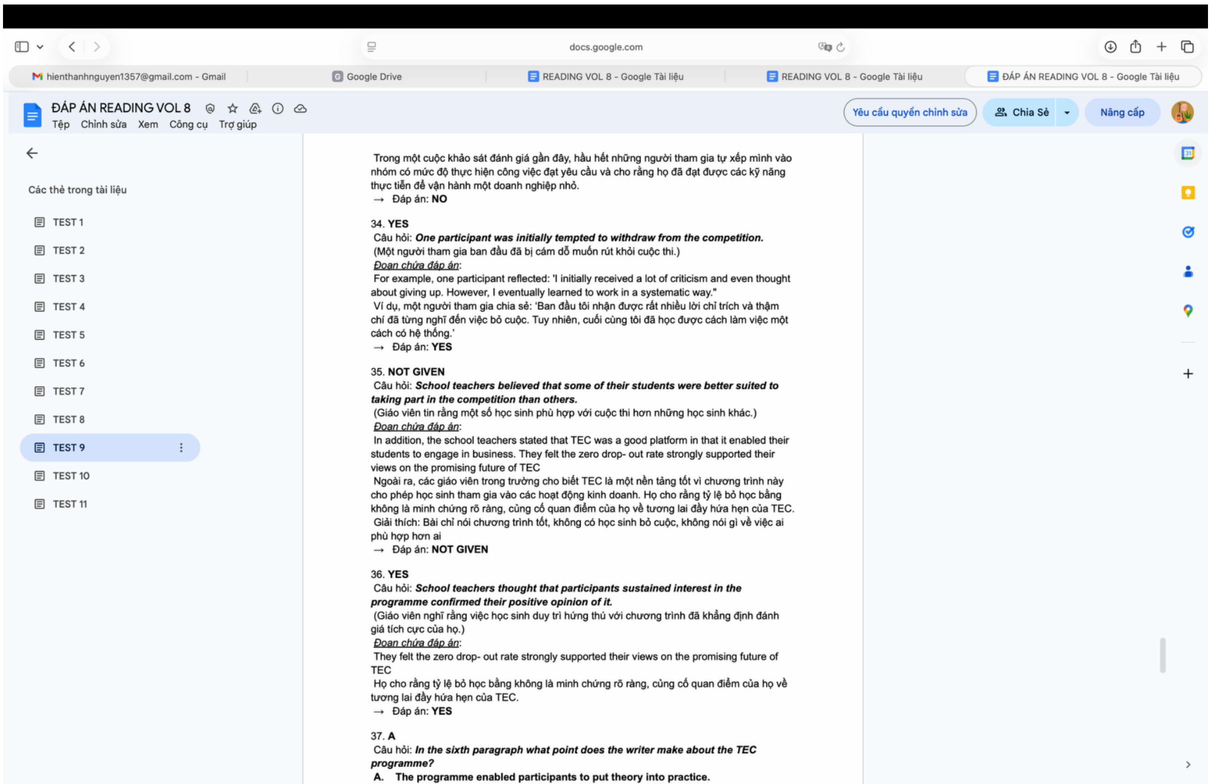
30. **D**
Câu hỏi: ***Before meeting the teams, the instructors go to _______, where they develop practical skills…***
(trước khi gặp các đội, các giảng viên hướng dẫn sẽ đến _______, nơi họ được rèn luyện các kỹ năng thực hành…)
Đoạn chứa đáp án:
These instructors attend a series of training sessions that cover the concepts of entrepreneurship and practical skills for business start-ups.
Những giảng viên này tham gia một loạt các buổi đào tạo, trong đó bao gồm các khái niệm về khởi nghiệp và những kỹ năng thực hành cần thiết cho việc thành lập doanh nghiệp
training sessions = workshops
→ Đáp án: **D workshops** (các buổi tập huấn)

31. **H**
Câu hỏi:***… and are taught a range of entrepreneurial _______.***
(và được giảng dạy nhiều _______ về khởi nghiệp.)
Đoạn chứa đáp án:
These instructors attend a series of training sessions that cover the concepts of entrepreneurship and practical skills for business start-ups.
Những giảng viên này tham gia một loạt các buổi đào tạo, trong đó bao gồm các khái niệm về khởi nghiệp và những kỹ năng thực hành cần thiết cho việc thành lập doanh nghiệp
concepts = theories
→ Đáp án: **H theories** (các lý thuyết)

32. **B**
Câu hỏi: ***The competition requires teams to come up with a new business _______ for the Chinese New Year.***
(Cuộc thi yêu cầu các đội đưa ra một _______ kinh doanh mới cho dịp Tết Nguyên đán.)
Đoạn chứa đáp án:
Over a three-month period, the teams are required to brainstorm an innovative business start-up that is suitable for the Chinese New Year.
Trong khoảng thời gian ba tháng, các nhóm được yêu cầu cùng nhau động não để xây dựng một ý tưởng khởi nghiệp sáng tạo, phù hợp với dịp Tết Nguyên đán.
business start-up = venture
→ Đáp án: **B venture** (doanh nghiệp khởi nghiệp)

33. **NO**
Câu hỏi: ***The questionnaire results indicated that relatively few participants were satisfied with their performance in TEC.***
(Kết quả bảng hỏi cho thấy chỉ có tương đối ít người tham gia hài lòng với kết quả của họ trong TEC.)
Đoạn chứa đáp án:
In a recent evaluation survey, most participants ranked themselves in the satisfactory performance category and considered they had gained practical skills to run a small business.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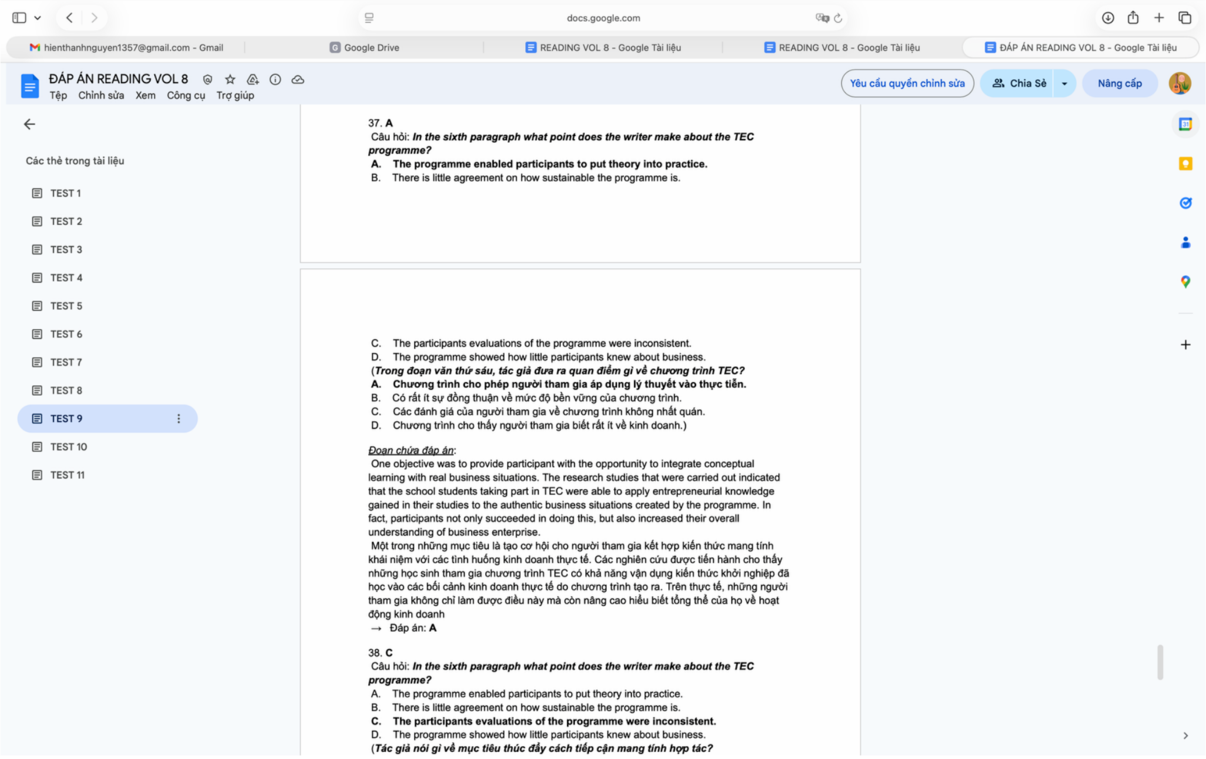
Trong một cuộc khảo sát đánh giá gần đây, hầu hết những người tham gia tự xếp mình vào nhóm có mức độ thực hiện công việc đạt yêu cầu và cho rằng họ đã đạt được các kỹ năng thực tiễn để vận hành một doanh nghiệp nhỏ.
→ Đáp án: **NO**

34. **YES**
Câu hỏi: ***One participant was initially tempted to withdraw from the competition.***
(Một người tham gia ban đầu đã bị cám dỗ muốn rút khỏi cuộc thi.)
Đoạn chứa đáp án:
For example, one participant reflected: 'I initially received a lot of criticism and even thought about giving up. However, I eventually learned to work in a systematic way."
Ví dụ, một người tham gia chia sẻ: 'Ban đầu tôi nhận được rất nhiều lời chỉ trích và thậm chí đã từng nghĩ đến việc bỏ cuộc. Tuy nhiên, cuối cùng tôi đã học được cách làm việc một cách có hệ thống.'
→ Đáp án: **YES**

35. **NOT GIVEN**
Câu hỏi: ***School teachers believed that some of their students were better suited to taking part in the competition than others.***
(Giáo viên tin rằng một số học sinh phù hợp với cuộc thi hơn những học sinh khác.)
Đoạn chứa đáp án:
In addition, the school teachers stated that TEC was a good platform in that it enabled their students to engage in business. They felt the zero drop- out rate strongly supported their views on the promising future of TEC
Ngoài ra, các giáo viên trong trường cho biết TEC là một nền tảng tốt vì chương trình này cho phép học sinh tham gia vào các hoạt động kinh doanh. Họ cho rằng tỷ lệ bỏ học bằng không là minh chứng rõ ràng, củng cố quan điểm của họ về tương lai đầy hứa hẹn của TEC.
Giải thích: Bài chỉ nói chương trình tốt, không có học sinh bỏ cuộc, không nói gì về việc ai phù hợp hơn ai
→ Đáp án: **NOT GIVEN**

36. **YES**
Câu hỏi: ***School teachers thought that participants sustained interest in the programme confirmed their positive opinion of it.***
(Giáo viên nghĩ rằng việc học sinh duy trì hứng thú với chương trình đã khẳng định đánh giá tích cực của họ.)
Đoạn chứa đáp án:
They felt the zero drop- out rate strongly supported their views on the promising future of TEC
Họ cho rằng tỷ lệ bỏ học bằng không là minh chứng rõ ràng, củng cố quan điểm của họ về tương lai đầy hứa hẹn của TEC.
→ Đáp án: **YES**

37. **A**
Câu hỏi: ***In the sixth paragraph what point does the writer make about the TEC programme?***
A. The programme enabled participants to put theory into practice.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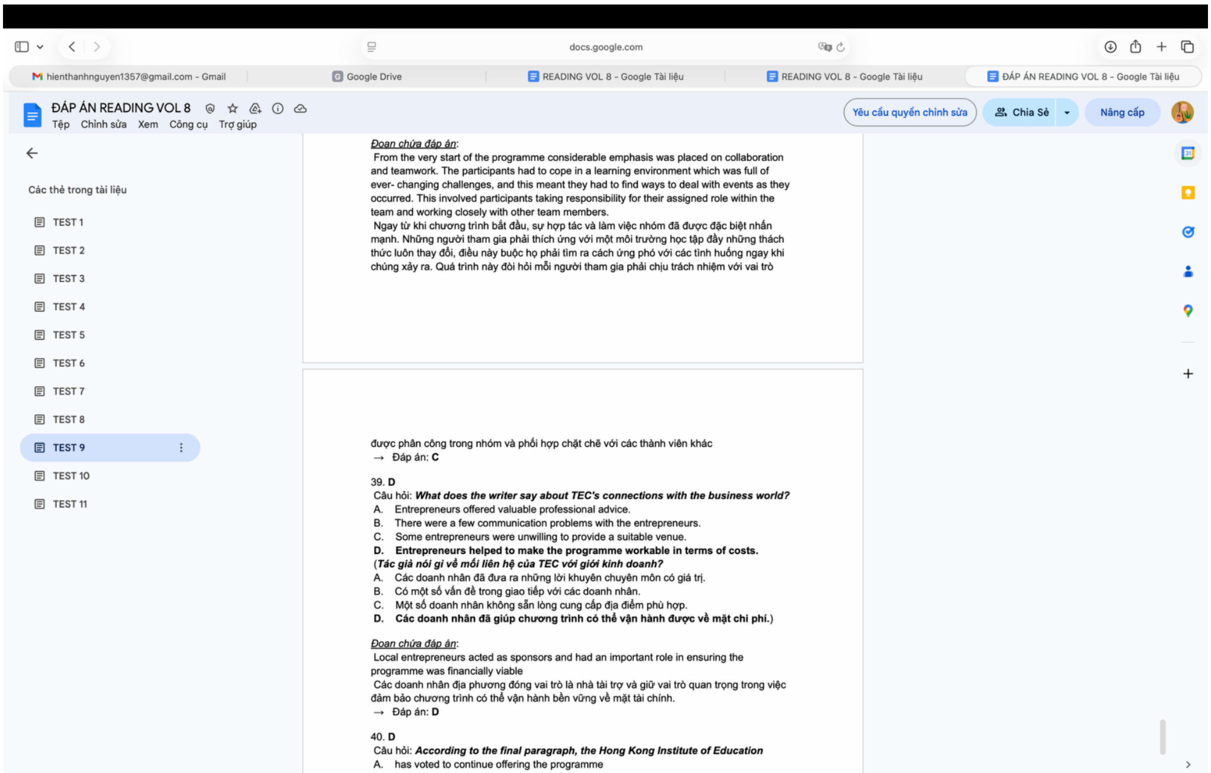
37. **A**
Câu hỏi: ***In the sixth paragraph what point does the writer make about the TEC programme?***
A. The programme enabled participants to put theory into practice.
B. There is little agreement on how sustainable the programme is.
C. The participants evaluations of the programme were inconsistent.
D. The programme showed how little participants knew about business.
(***Trong đoạn văn thứ sáu, tác giả đưa ra quan điểm gì về chương trình TEC?***
A. Chương trình cho phép người tham gia áp dụng lý thuyết vào thực tiễn.
B. Có rất ít sự đồng thuận về mức độ bền vững của chương trình.
C. Các đánh giá của người tham gia về chương trình không nhất quán.
D. Chương trình cho thấy người tham gia biết rất ít về kinh doanh.)

Đoạn chứa đáp án:
One objective was to provide participant with the opportunity to integrate conceptual learning with real business situations. The research studies that were carried out indicated that the school students taking part in TEC were able to apply entrepreneurial knowledge gained in their studies to the authentic business situations created by the programme. In fact, participants not only succeeded in doing this, but also increased their overall understanding of business enterprise.
Một trong những mục tiêu là tạo cơ hội cho người tham gia kết hợp kiến thức mang tính khái niệm với các tình huống kinh doanh thực tế. Các nghiên cứu được tiến hành cho thấy những học sinh tham gia chương trình TEC có khả năng vận dụng kiến thức khởi nghiệp đã học vào các bối cảnh kinh doanh thực tế do chương trình tạo ra. Trên thực tế, những người tham gia không chỉ làm được điều này mà còn nâng cao hiểu biết tổng thể của họ về hoạt động kinh doanh
→ Đáp án: **A**

38. **C**
Câu hỏi: ***In the sixth paragraph what point does the writer make about the TEC programme?***
A. The programme enabled participants to put theory into practice.
B. There is little agreement on how sustainable the programme is.
C. The participants evaluations of the programme were inconsistent.
D. The programme showed how little participants knew about business.
(***Tác giả nói gì về mục tiêu thúc đẩy cách tiếp cận mang tính hợp tác?***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Đoạn chứa đáp án:

From the very start of the programme considerable emphasis was placed on collaboration and teamwork. The participants had to cope in a learning environment which was full of ever- changing challenges, and this meant they had to find ways to deal with events as they occurred. This involved participants taking responsibility for their assigned role within the team and working closely with other team members.

Ngay từ khi chương trình bắt đầu, sự hợp tác và làm việc nhóm đã được đặc biệt nhấn mạnh. Những người tham gia phải thích ứng với một môi trường học tập đầy những thách thức luôn thay đổi, điều này buộc họ phải tìm ra cách ứng phó với các tình huống ngay khi chúng xảy ra. Quá trình này đòi hỏi mỗi người tham gia phải chịu trách nhiệm với vai trò được phân công trong nhóm và phối hợp chặt chẽ với các thành viên khác

→ Đáp án: **C**

39. **D**

Câu hỏi: ***What does the writer say about TEC's connections with the business world?***

A. Entrepreneurs offered valuable professional advice.
B. There were a few communication problems with the entrepreneurs.
C. Some entrepreneurs were unwilling to provide a suitable venue.
D. Entrepreneurs helped to make the programme workable in terms of costs.

(***Tác giả nói gì về mối liên hệ của TEC với giới kinh doanh?***

A. Các doanh nhân đã đưa ra những lời khuyên chuyên môn có giá trị.
B. Có một số vấn đề trong giao tiếp với các doanh nhân.
C. Một số doanh nhân không sẵn lòng cung cấp địa điểm phù hợp.
D. Các doanh nhân đã giúp chương trình có thể vận hành được về mặt chi phí.)

Đoạn chứa đáp án:

Local entrepreneurs acted as sponsors and had an important role in ensuring the programme was financially viable

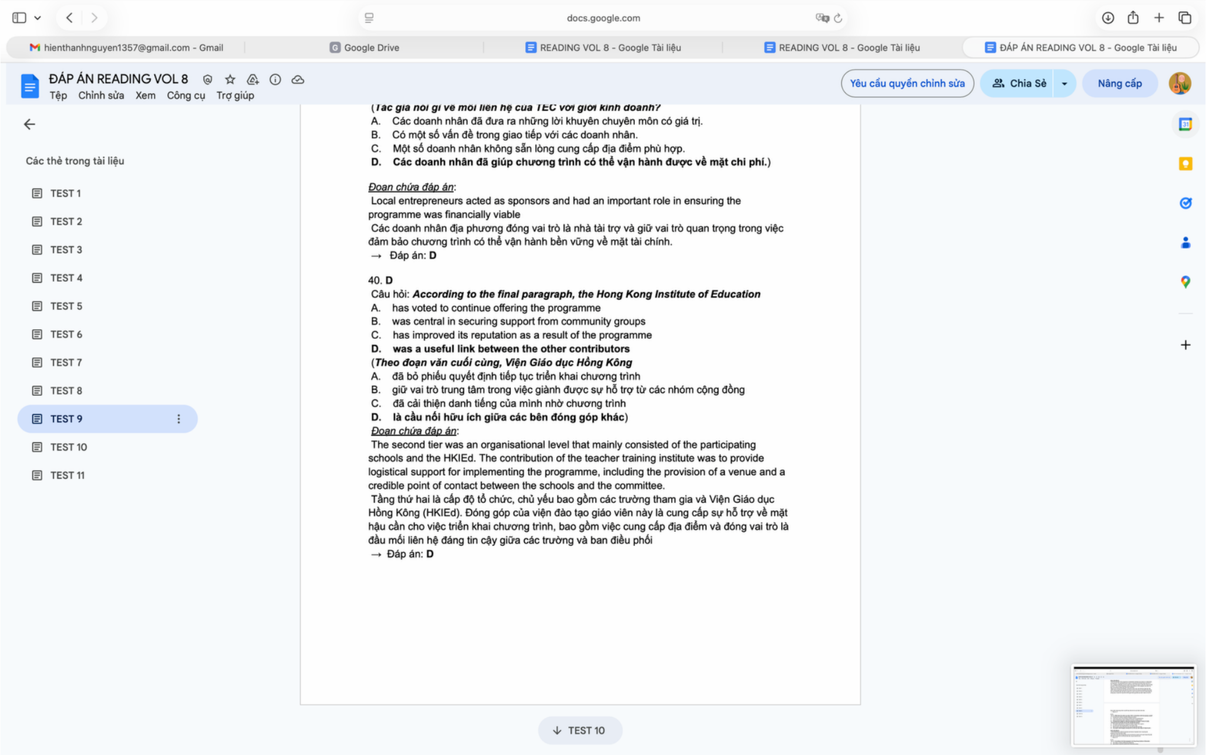
Các doanh nhân địa phương đóng vai trò là nhà tài trợ và giữ vai trò quan trọng trong việc đảm bảo chương trình có thể vận hành bền vững về mặt tài chính.

→ Đáp án: **D**

40. **D**

Câu hỏi: ***According to the final paragraph, the Hong Kong Institute of Education***

A. has voted to continue offering the programme
B. was central in securing support from community groups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(***Tác giả nói gì về mối liên hệ của TEC với giới kinh doanh?***

A. Các doanh nhân đã đưa ra những lời khuyên chuyên môn có giá trị.
B. Có một số vấn đề trong giao tiếp với các doanh nhân.
C. Một số doanh nhân không sẵn lòng cung cấp địa điểm phù hợp.
D. Các doanh nhân đã giúp chương trình có thể vận hành được về mặt chi phí.)

Đoạn chứa đáp án:

Local entrepreneurs acted as sponsors and had an important role in ensuring the programme was financially viable

Các doanh nhân địa phương đóng vai trò là nhà tài trợ và giữ vai trò quan trọng trong việc đảm bảo chương trình có thể vận hành bền vững về mặt tài chính.

→ Đáp án: **D**

40. **D**

Câu hỏi: ***According to the final paragraph, the Hong Kong Institute of Education***

A. has voted to continue offering the programme
B. was central in securing support from community groups

C. has improved its reputation as a result of the programme
D. was a useful link between the other contributors

(***Theo đoạn văn cuối cùng, Viện Giáo dục Hồng Kông***

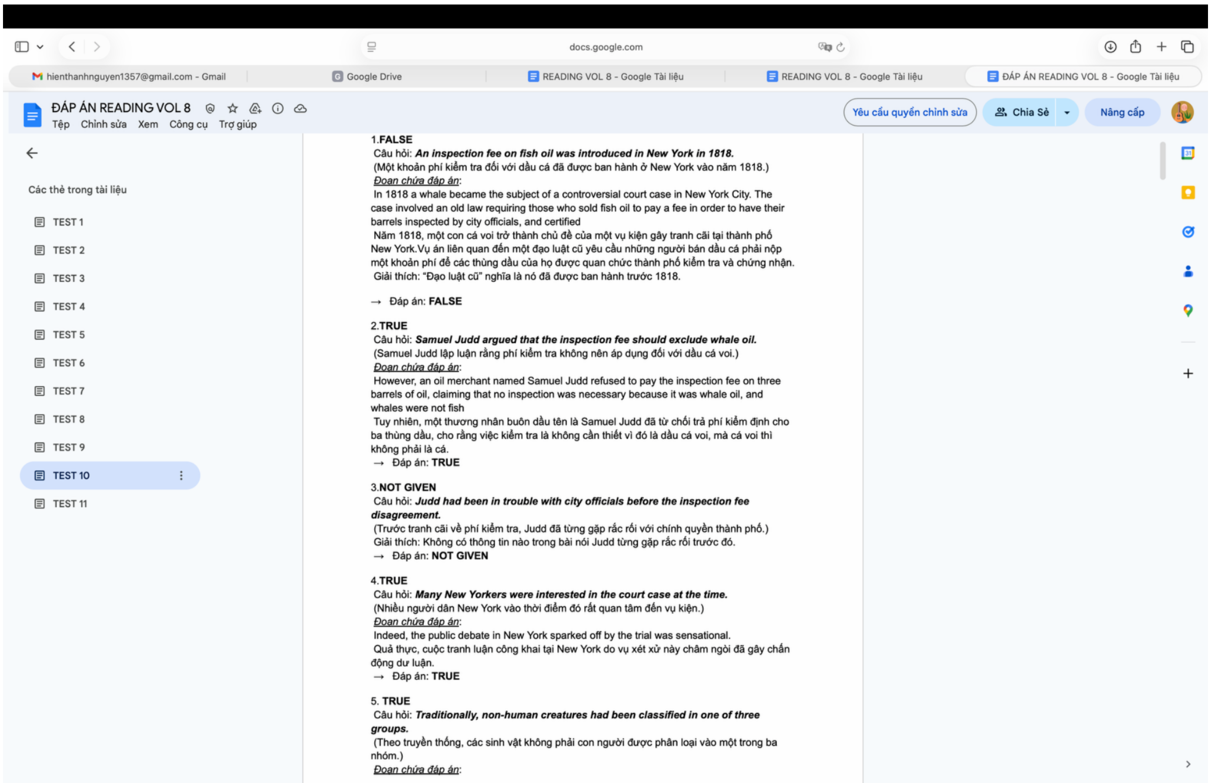
A. đã bỏ phiếu quyết định tiếp tục triển khai chương trình
B. giữ vai trò trung tâm trong việc giành được sự hỗ trợ từ các nhóm cộng đồng
C. đã cải thiện danh tiếng của mình nhờ chương trình
D. là cầu nối hữu ích giữa các bên đóng góp khác)

Đoạn chứa đáp án:

The second tier was an organisational level that mainly consisted of the participating schools and the HKIEd. The contribution of the teacher training institute was to provide logistical support for implementing the programme, including the provision of a venue and a credible point of contact between the schools and the committee.

Tầng thứ hai là cấp độ tổ chức, chủ yếu bao gồm các trường tham gia và Viện Giáo dục Hồng Kông (HKIEd). Đóng góp của viện đào tạo giáo viên này là cung cấp sự hỗ trợ về mặt hậu cần cho việc triển khai chương trình, bao gồm việc cung cấp địa điểm và đóng vai trò là đầu mối liên hệ đáng tin cậy giữa các trường và ban điều phối

→ Đáp án: **D**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1.**FALSE**
Câu hỏi: ***An inspection fee on fish oil was introduced in New York in 1818.***
(Một khoản phí kiểm tra đối với dầu cá đã được ban hành ở New York vào năm 1818.)
Đoạn chứa đáp án:
In 1818 a whale became the subject of a controversial court case in New York City. The case involved an old law requiring those who sold fish oil to pay a fee in order to have their barrels inspected by city officials, and certified
Năm 1818, một con cá voi trở thành chủ đề của một vụ kiện gây tranh cãi tại thành phố New York.Vụ án liên quan đến một đạo luật cũ yêu cầu những người bán dầu cá phải nộp một khoản phí để các thùng dầu của họ được quan chức thành phố kiểm tra và chứng nhận.
Giải thích: "Đạo luật cũ" nghĩa là nó đã được ban hành trước 1818.

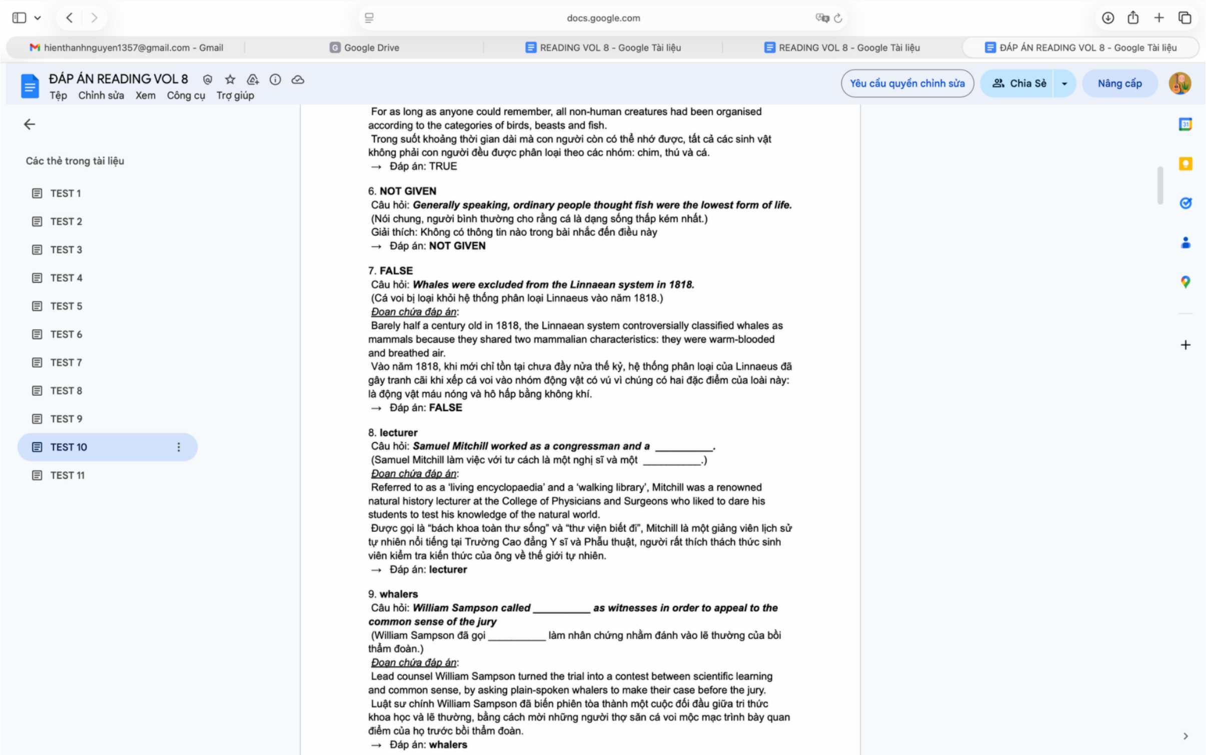
→ Đáp án: **FALSE**

2.**TRUE**
Câu hỏi: ***Samuel Judd argued that the inspection fee should exclude whale oil.***
(Samuel Judd lập luận rằng phí kiểm tra không nên áp dụng đối với dầu cá voi.)
Đoạn chứa đáp án:
However, an oil merchant named Samuel Judd refused to pay the inspection fee on three barrels of oil, claiming that no inspection was necessary because it was whale oil, and whales were not fish
Tuy nhiên, một thương nhân buôn dầu tên là Samuel Judd đã từ chối trả phí kiểm định cho ba thùng dầu, cho rằng việc kiểm tra là không cần thiết vì đó là dầu cá voi, mà cá voi thì không phải là cá.
→ Đáp án: **TRUE**

3.**NOT GIVEN**
Câu hỏi: ***Judd had been in trouble with city officials before the inspection fee disagreement.***
(Trước tranh cãi về phí kiểm tra, Judd đã từng gặp rắc rối với chính quyền thành phố.)
Giải thích: Không có thông tin nào trong bài nói Judd từng gặp rắc rối trước đó.
→ Đáp án: **NOT GIVEN**

4.**TRUE**
Câu hỏi: ***Many New Yorkers were interested in the court case at the time.***
(Nhiều người dân New York vào thời điểm đó rất quan tâm đến vụ kiện.)
Đoạn chứa đáp án:
Indeed, the public debate in New York sparked off by the trial was sensational.
Quả thực, cuộc tranh luận công khai tại New York do vụ xét xử này châm ngòi đã gây chấn động dư luận.
→ Đáp án: **TRUE**

5. **TRUE**
Câu hỏi: ***Traditionally, non-human creatures had been classified in one of three groups.***
(Theo truyền thống, các sinh vật không phải con người được phân loại vào một trong ba nhóm.)
Đoạn chứa đáp án: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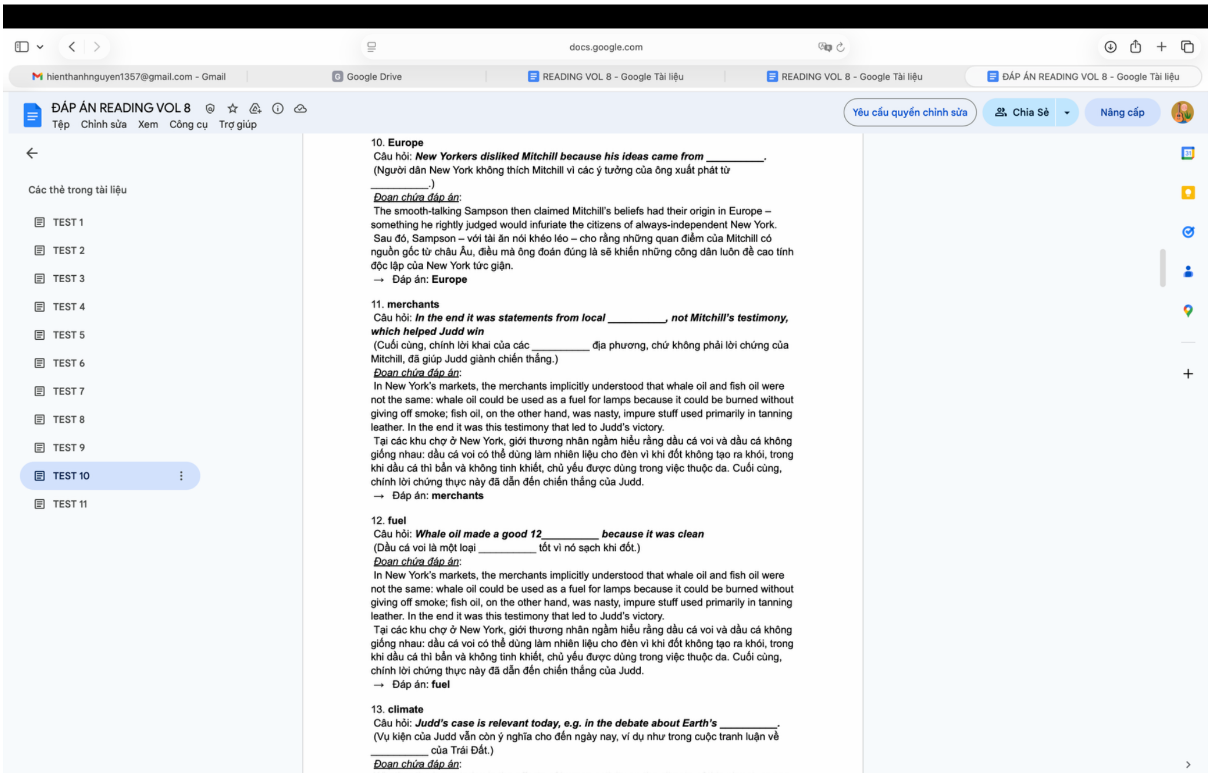
For as long as anyone could remember, all non-human creatures had been organised according to the categories of birds, beasts and fish.
Trong suốt khoảng thời gian dài mà con người còn có thể nhớ được, tất cả các sinh vật không phải con người đều được phân loại theo các nhóm: chim, thú và cá.
→ Đáp án: TRUE

6. **NOT GIVEN**
Câu hỏi: ***Generally speaking, ordinary people thought fish were the lowest form of life.***
(Nói chung, người bình thường cho rằng cá là dạng sống thấp kém nhất.)
Giải thích: Không có thông tin nào trong bài nhắc đến điều này
→ Đáp án: **NOT GIVEN**

7. **FALSE**
Câu hỏi: ***Whales were excluded from the Linnaean system in 1818.***
(Cá voi bị loại khỏi hệ thống phân loại Linnaeus vào năm 1818.)
Đoạn chứa đáp án:
Barely half a century old in 1818, the Linnaean system controversially classified whales as mammals because they shared two mammalian characteristics: they were warm-blooded and breathed air.
Vào năm 1818, khi mới chỉ tồn tại chưa đầy nửa thế kỷ, hệ thống phân loại của Linnaeus đã gây tranh cãi khi xếp cá voi vào nhóm động vật có vú vì chúng có hai đặc điểm của loài này: là động vật máu nóng và hô hấp bằng không khí.
→ Đáp án: **FALSE**

8. **lecturer**
Câu hỏi: ***Samuel Mitchill worked as a congressman and a __________.***
(Samuel Mitchill làm việc với tư cách là một nghị sĩ và một __________.)
Đoạn chứa đáp án:
Referred to as a 'living encyclopaedia' and a 'walking library', Mitchill was a renowned natural history lecturer at the College of Physicians and Surgeons who liked to dare his students to test his knowledge of the natural world.
Được gọi là "bách khoa toàn thư sống" và "thư viện biết đi", Mitchill là một giảng viên lịch sử tự nhiên nổi tiếng tại Trường Cao đẳng Y sĩ và Phẫu thuật, người rất thích thách thức sinh viên kiểm tra kiến thức của ông về thế giới tự nhiên.
→ Đáp án: **lecturer**

9. **whalers**
Câu hỏi: ***William Sampson called __________ as witnesses in order to appeal to the common sense of the jury***
(William Sampson đã gọi __________ làm nhân chứng nhằm đánh vào lẽ thường của bồi thẩm đoàn.)
Đoạn chứa đáp án:
Lead counsel William Sampson turned the trial into a contest between scientific learning and common sense, by asking plain-spoken whalers to make their case before the jury.
Luật sư chính William Sampson đã biến phiên tòa thành một cuộc đối đầu giữa tri thức khoa học và lẽ thường, bằng cách mời những người thợ săn cá voi mộc mạc trình bày quan điểm của họ trước bồi thẩm đoàn.
→ Đáp án: **whalers**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10. **Europe**

Câu hỏi: ***New Yorkers disliked Mitchill because his ideas came from __________.***

(Người dân New York không thích Mitchill vì các ý tưởng của ông xuất phát từ __________.)

Đoạn chứa đáp án:

The smooth-talking Sampson then claimed Mitchill's beliefs had their origin in Europe – something he rightly judged would infuriate the citizens of always-independent New York.

Sau đó, Sampson – với tài ăn nói khéo léo – cho rằng những quan điểm của Mitchill có nguồn gốc từ châu Âu, điều mà ông đoán đúng là sẽ khiến những công dân luôn đề cao tính độc lập của New York tức giận.

→ Đáp án: **Europe**

11. **merchants**

Câu hỏi: ***In the end it was statements from local __________, not Mitchill's testimony, which helped Judd win***

(Cuối cùng, chính lời khai của các __________ địa phương, chứ không phải lời chứng của Mitchill, đã giúp Judd giành chiến thắng.)

Đoạn chứa đáp án:

In New York's markets, the merchants implicitly understood that whale oil and fish oil were not the same: whale oil could be used as a fuel for lamps because it could be burned without giving off smoke; fish oil, on the other hand, was nasty, impure stuff used primarily in tanning leather. In the end it was this testimony that led to Judd's victory.

Tại các khu chợ ở New York, giới thương nhân ngầm hiểu rằng dầu cá voi và dầu cá không giống nhau: dầu cá voi có thể dùng làm nhiên liệu cho đèn vì khi đốt không tạo ra khói, trong khi dầu cá thì bẩn và không tinh khiết, chủ yếu được dùng trong việc thuộc da. Cuối cùng, chính lời chứng thực này đã dẫn đến chiến thắng của Judd.

→ Đáp án: **merchants**

12. **fuel**

Câu hỏi: ***Whale oil made a good 12__________ because it was clean***

(Dầu cá voi là một loại __________ tốt vì nó sạch khi đốt.)

Đoạn chứa đáp án:

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→ Đáp án: **fuel**

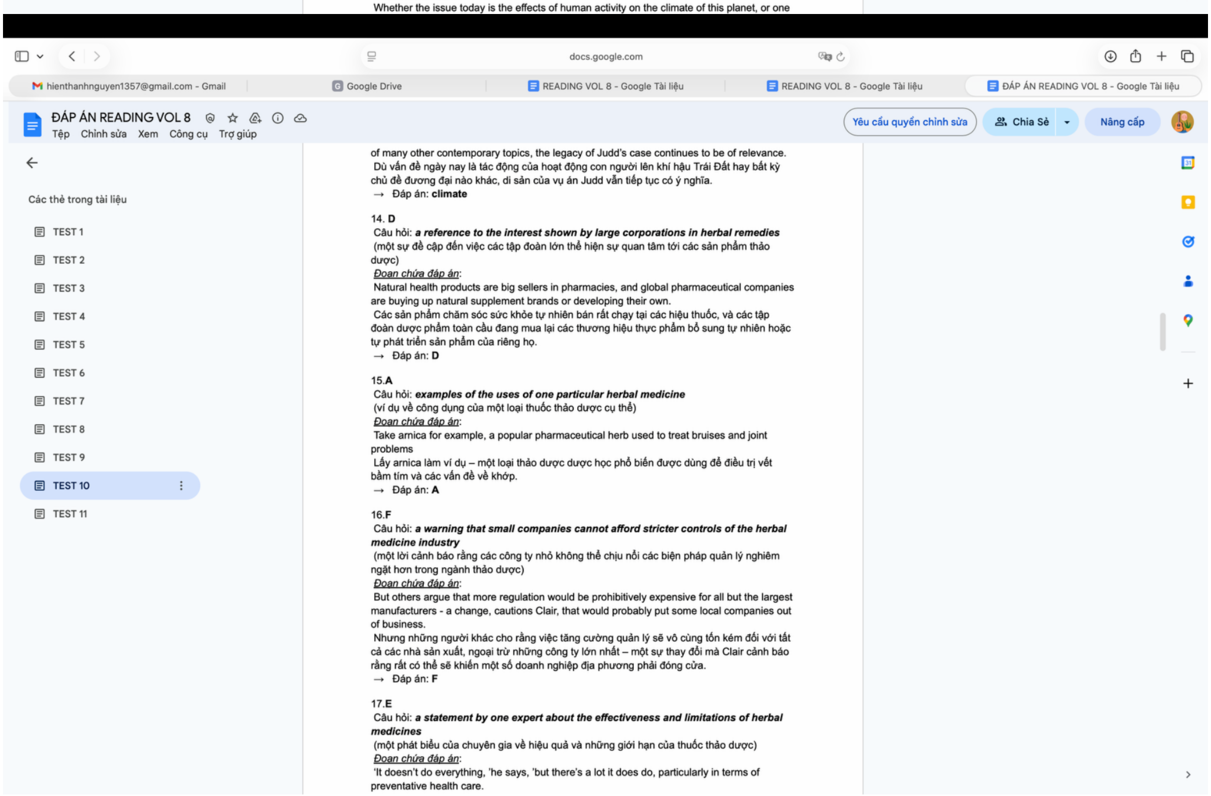
13. **climate**

Câu hỏi: ***Judd's case is relevant today, e.g. in the debate about Earth's __________.***

(Vụ kiện của Judd vẫn còn ý nghĩa cho đến ngày nay, ví dụ như trong cuộc tranh luận về __________ của Trái Đất.)

Đoạn chứa đáp án:

Whether the issue today is the effects of human activity on the climate of this planet, or one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of many other contemporary topics, the legacy of Judd's case continues to be of relevance.

Dù vấn đề ngày nay là tác động của hoạt động con người lên khí hậu Trái Đất hay bất kỳ chủ đề đương đại nào khác, di sản của vụ án Judd vẫn tiếp tục có ý nghĩa.

→ Đáp án: **climate**

14. **D**

Câu hỏi: ***a reference to the interest shown by large corporations in herbal remedies***

(một sự đề cập đến việc các tập đoàn lớn thể hiện sự quan tâm tới các sản phẩm thảo dược)

Đoạn chứa đáp án:

Natural health products are big sellers in pharmacies, and global pharmaceutical companies are buying up natural supplement brands or developing their own.

Các sản phẩm chăm sóc sức khỏe tự nhiên bán rất chạy tại các hiệu thuốc, và các tập đoàn dược phẩm toàn cầu đang mua lại các thương hiệu thực phẩm bổ sung tự nhiên hoặc tự phát triển sản phẩm của riêng họ.

→ Đáp án: **D**

15.**A**

Câu hỏi: ***examples of the uses of one particular herbal medicine***

(ví dụ về công dụng của một loại thuốc thảo dược cụ thể)

Đoạn chứa đáp án:

Take arnica for example, a popular pharmaceutical herb used to treat bruises and joint problems

Lấy arnica làm ví dụ – một loại thảo dược dược học phổ biến được dùng để điều trị vết bầm tím và các vấn đề về khớp.

→ Đáp án: **A**

16.**F**

Câu hỏi: ***a warning that small companies cannot afford stricter controls of the herbal medicine industry***

(một lời cảnh báo rằng các công ty nhỏ không thể chịu nổi các biện pháp quản lý nghiêm ngặt hơn trong ngành thảo dược)

Đoạn chứa đáp án:

But others argue that more regulation would be prohibitively expensive for all but the largest manufacturers - a change, cautions Clair, that would probably put some local companies out of business.

Nhưng những người khác cho rằng việc tăng cường quản lý sẽ vô cùng tốn kém đối với tất cả các nhà sản xuất, ngoại trừ những công ty lớn nhất – một sự thay đổi mà Clair cảnh báo rằng rất có thể sẽ khiến một số doanh nghiệp địa phương phải đóng cửa.

→ Đáp án: **F**

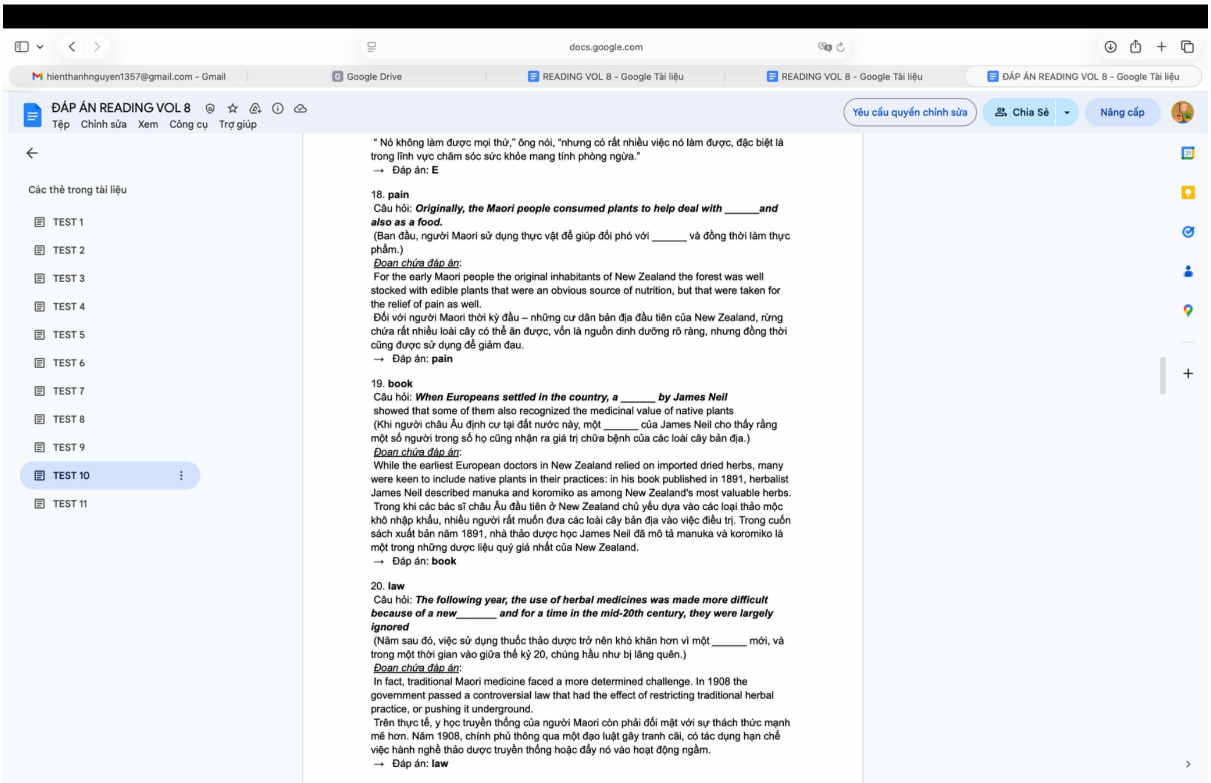
17.**E**

Câu hỏi: ***a statement by one expert about the effectiveness and limitations of herbal medicines***

(một phát biểu của chuyên gia về hiệu quả và những giới hạn của thuốc thảo dược)

Đoạn chứa đáp án:

'It doesn't do everything, 'he says, 'but there's a lot it does do, particularly in terms of preventative health care.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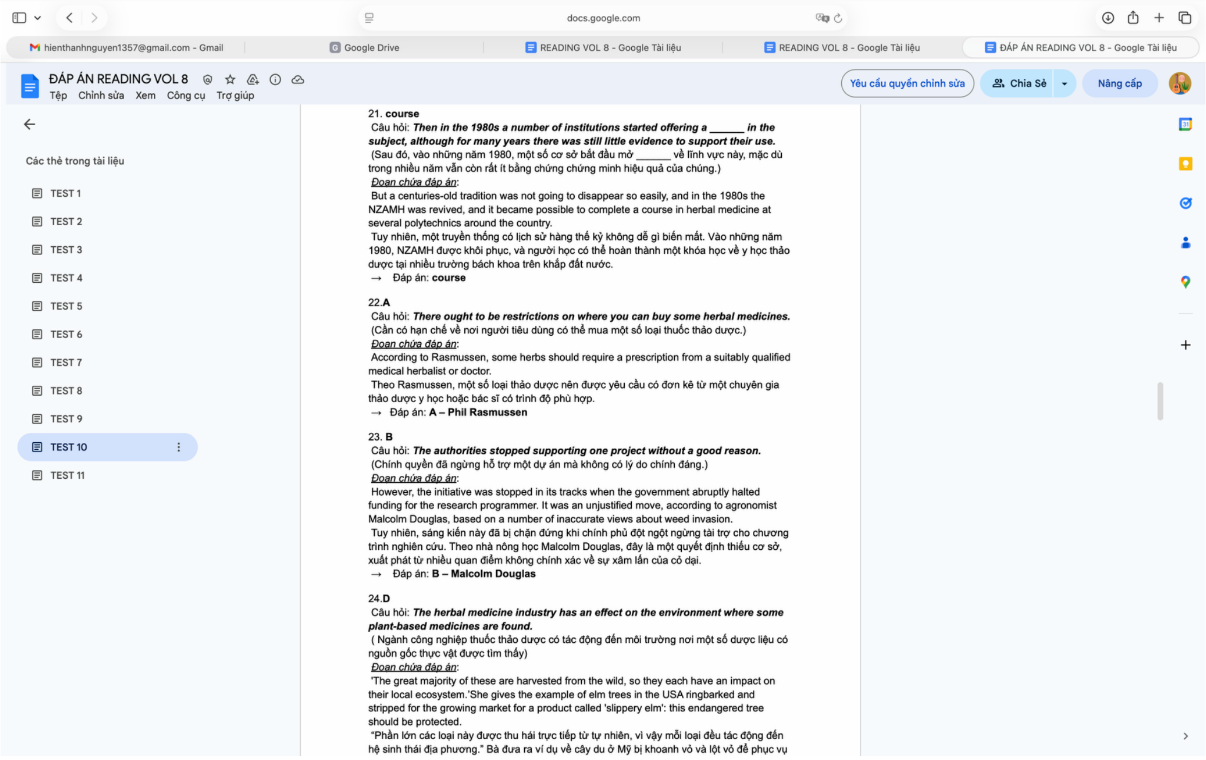
" Nó không làm được mọi thứ," ông nói, "nhưng có rất nhiều việc nó làm được, đặc biệt là trong lĩnh vực chăm sóc sức khỏe mang tính phòng ngừa."
→ Đáp án: **E**

18. **pain**
Câu hỏi: ***Originally, the Maori people consumed plants to help deal with ______and also as a food.***
(Ban đầu, người Maori sử dụng thực vật để giúp đối phó với ______ và đồng thời làm thực phẩm.)
Đoạn chứa đáp án:
For the early Maori people the original inhabitants of New Zealand the forest was well stocked with edible plants that were an obvious source of nutrition, but that were taken for the relief of pain as well.
Đối với người Maori thời kỳ đầu – những cư dân bản địa đầu tiên của New Zealand, rừng chứa rất nhiều loài cây có thể ăn được, vốn là nguồn dinh dưỡng rõ ràng, nhưng đồng thời cũng được sử dụng để giảm đau.
→ Đáp án: **pain**

19. **book**
Câu hỏi: ***When Europeans settled in the country, a ______ by James Neil*** showed that some of them also recognized the medicinal value of native plants
(Khi người châu Âu định cư tại đất nước này, một ______ của James Neil cho thấy rằng một số người trong số họ cũng nhận ra giá trị chữa bệnh của các loài cây bản địa.)
Đoạn chứa đáp án:
While the earliest European doctors in New Zealand relied on imported dried herbs, many were keen to include native plants in their practices: in his book published in 1891, herbalist James Neil described manuka and koromiko as among New Zealand's most valuable herbs.
Trong khi các bác sĩ châu Âu đầu tiên ở New Zealand chủ yếu dựa vào các loại thảo mộc khô nhập khẩu, nhiều người rất muốn đưa các loài cây bản địa vào việc điều trị. Trong cuốn sách xuất bản năm 1891, nhà thảo dược học James Neil đã mô tả manuka và koromiko là một trong những dược liệu quý giá nhất của New Zealand.
→ Đáp án: **book**

20. **law**
Câu hỏi: ***The following year, the use of herbal medicines was made more difficult because of a new_______ and for a time in the mid-20th century, they were largely ignored***
(Năm sau đó, việc sử dụng thuốc thảo dược trở nên khó khăn hơn vì một ______ mới, và trong một thời gian vào giữa thế kỷ 20, chúng hầu như bị lãng quên.)
Đoạn chứa đáp án:
In fact, traditional Maori medicine faced a more determined challenge. In 1908 the government passed a controversial law that had the effect of restricting traditional herbal practice, or pushing it underground.
Trên thực tế, y học truyền thống của người Maori còn phải đối mặt với sự thách thức mạnh mẽ hơn. Năm 1908, chính phủ thông qua một đạo luật gây tranh cãi, có tác dụng hạn chế việc hành nghề thảo dược truyền thống hoặc đẩy nó vào hoạt động ngầm.
→ Đáp án: **law**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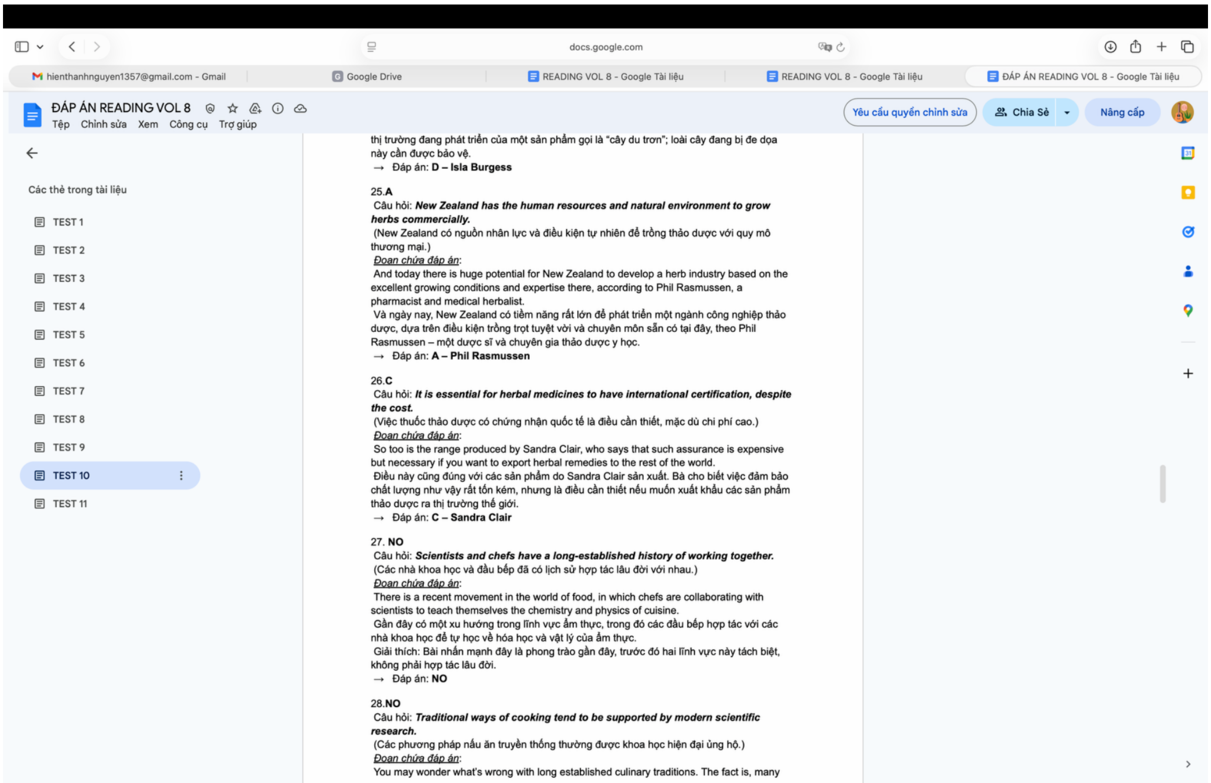
21. **course**
Câu hỏi: ***Then in the 1980s a number of institutions started offering a ______ in the subject, although for many years there was still little evidence to support their use.***
(Sau đó, vào những năm 1980, một số cơ sở bắt đầu mở ______ về lĩnh vực này, mặc dù trong nhiều năm vẫn còn rất ít bằng chứng chứng minh hiệu quả của chúng.)
Đoạn chứa đáp án:
But a centuries-old tradition was not going to disappear so easily, and in the 1980s the NZAMH was revived, and it became possible to complete a course in herbal medicine at several polytechnics around the country.
Tuy nhiên, một truyền thống có lịch sử hàng thế kỷ không dễ gì biến mất. Vào những năm 1980, NZAMH được khôi phục, và người học có thể hoàn thành một khóa học về y học thảo dược tại nhiều trường bách khoa trên khắp đất nước.
→ Đáp án: **course**

22.**A**
Câu hỏi: ***There ought to be restrictions on where you can buy some herbal medicines.***
(Cần có hạn chế về nơi người tiêu dùng có thể mua một số loại thuốc thảo dược.)
Đoạn chứa đáp án:
According to Rasmussen, some herbs should require a prescription from a suitably qualified medical herbalist or doctor.
Theo Rasmussen, một số loại thảo dược nên được yêu cầu có đơn kê từ một chuyên gia thảo dược y học hoặc bác sĩ có trình độ phù hợp.
→ Đáp án: **A – Phil Rasmussen**

23. **B**
Câu hỏi: ***The authorities stopped supporting one project without a good reason.***
(Chính quyền đã ngừng hỗ trợ một dự án mà không có lý do chính đáng.)
Đoạn chứa đáp án:
However, the initiative was stopped in its tracks when the government abruptly halted funding for the research programmer. It was an unjustified move, according to agronomist Malcolm Douglas, based on a number of inaccurate views about weed invasion.
Tuy nhiên, sáng kiến này đã bị chặn đứng khi chính phủ đột ngột ngừng tài trợ cho chương trình nghiên cứu. Theo nhà nông học Malcolm Douglas, đây là một quyết định thiếu cơ sở, xuất phát từ nhiều quan điểm không chính xác về sự xâm lấn của cỏ dại.
→ Đáp án: **B – Malcolm Douglas**

24.**D**
Câu hỏi: ***The herbal medicine industry has an effect on the environment where some plant-based medicines are found.***
(Ngành công nghiệp thuốc thảo dược có tác động đến môi trường nơi một số dược liệu có nguồn gốc thực vật được tìm thấy)
Đoạn chứa đáp án:
'The great majority of these are harvested from the wild, so they each have an impact on their local ecosystem.'She gives the example of elm trees in the USA ringbarked and stripped for the growing market for a product called 'slippery elm': this endangered tree should be protected.
"Phần lớn các loại này được thu hái trực tiếp từ tự nhiên, vì vậy mỗi loại đều tác động đến hệ sinh thái địa phương." Bà đưa ra ví dụ về cây du ở Mỹ bị khoanh vỏ và lột vỏ để phục vụ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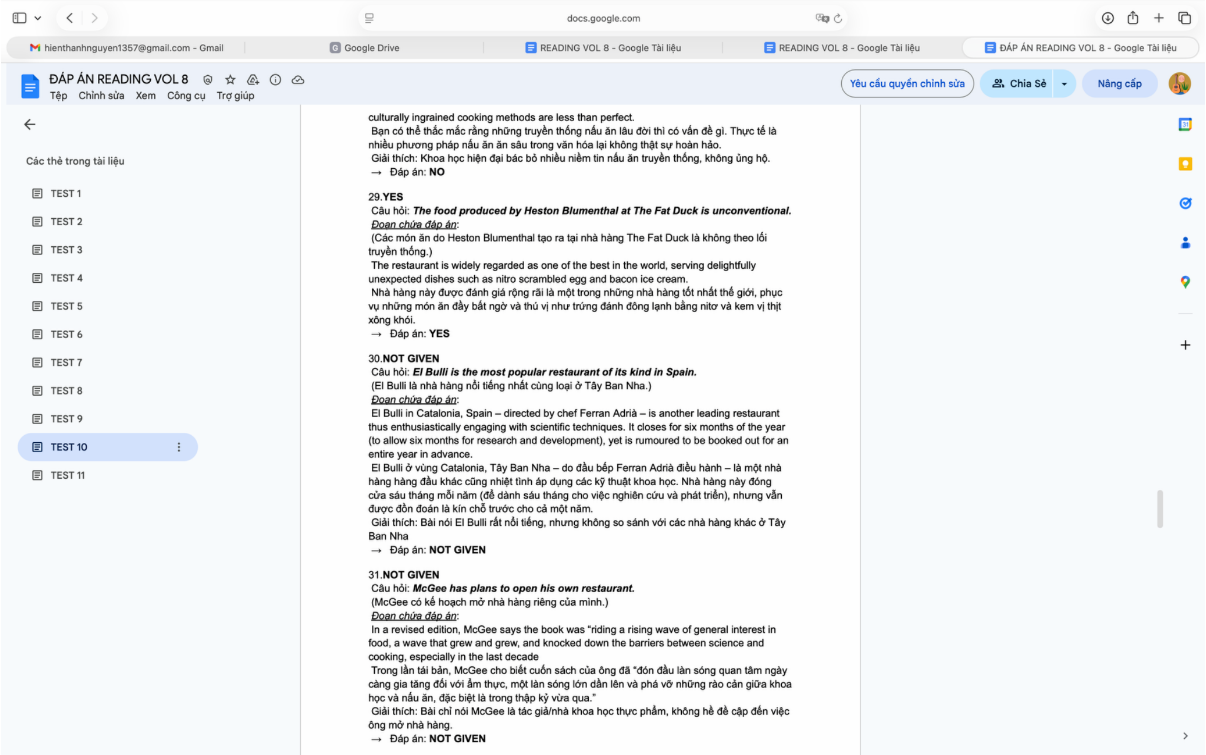
thị trường đang phát triển của một sản phẩm gọi là "cây du trơn"; loài cây đang bị đe dọa này cần được bảo vệ.
→ Đáp án: **D – Isla Burgess**

25.**A**
Câu hỏi: ***New Zealand has the human resources and natural environment to grow herbs commercially.***
(New Zealand có nguồn nhân lực và điều kiện tự nhiên để trồng thảo dược với quy mô thương mại.)
Đoạn chứa đáp án:
And today there is huge potential for New Zealand to develop a herb industry based on the excellent growing conditions and expertise there, according to Phil Rasmussen, a pharmacist and medical herbalist.
Và ngày nay, New Zealand có tiềm năng rất lớn để phát triển một ngành công nghiệp thảo dược, dựa trên điều kiện trồng trọt tuyệt vời và chuyên môn sẵn có tại đây, theo Phil Rasmussen – một dược sĩ và chuyên gia thảo dược y học.
→ Đáp án: **A – Phil Rasmussen**

26.**C**
Câu hỏi: ***It is essential for herbal medicines to have international certification, despite the cost.***
(Việc thuốc thảo dược có chứng nhận quốc tế là điều cần thiết, mặc dù chi phí cao.)
Đoạn chứa đáp án:
So too is the range produced by Sandra Clair, who says that such assurance is expensive but necessary if you want to export herbal remedies to the rest of the world.
Điều này cũng đúng với các sản phẩm do Sandra Clair sản xuất. Bà cho biết việc đảm bảo chất lượng như vậy rất tốn kém, nhưng là điều cần thiết nếu muốn xuất khẩu các sản phẩm thảo dược ra thị trường thế giới.
→ Đáp án: **C – Sandra Clair**

27. **NO**
Câu hỏi: ***Scientists and chefs have a long-established history of working together.***
(Các nhà khoa học và đầu bếp đã có lịch sử hợp tác lâu đời với nhau.)
Đoạn chứa đáp án:
There is a recent movement in the world of food, in which chefs are collaborating with scientists to teach themselves the chemistry and physics of cuisine.
Gần đây có một xu hướng trong lĩnh vực ẩm thực, trong đó các đầu bếp hợp tác với các nhà khoa học để tự học về hóa học và vật lý của ẩm thực.
Giải thích: Bài nhấn mạnh đây là phong trào gần đây, trước đó hai lĩnh vực này tách biệt, không phải hợp tác lâu đời.
→ Đáp án: **NO**

28.**NO**
Câu hỏi: ***Traditional ways of cooking tend to be supported by modern scientific research.***
(Các phương pháp nấu ăn truyền thống thường được khoa học hiện đại ủng hộ.)
Đoạn chứa đáp án:
You may wonder what's wrong with long established culinary traditions. The fact is, many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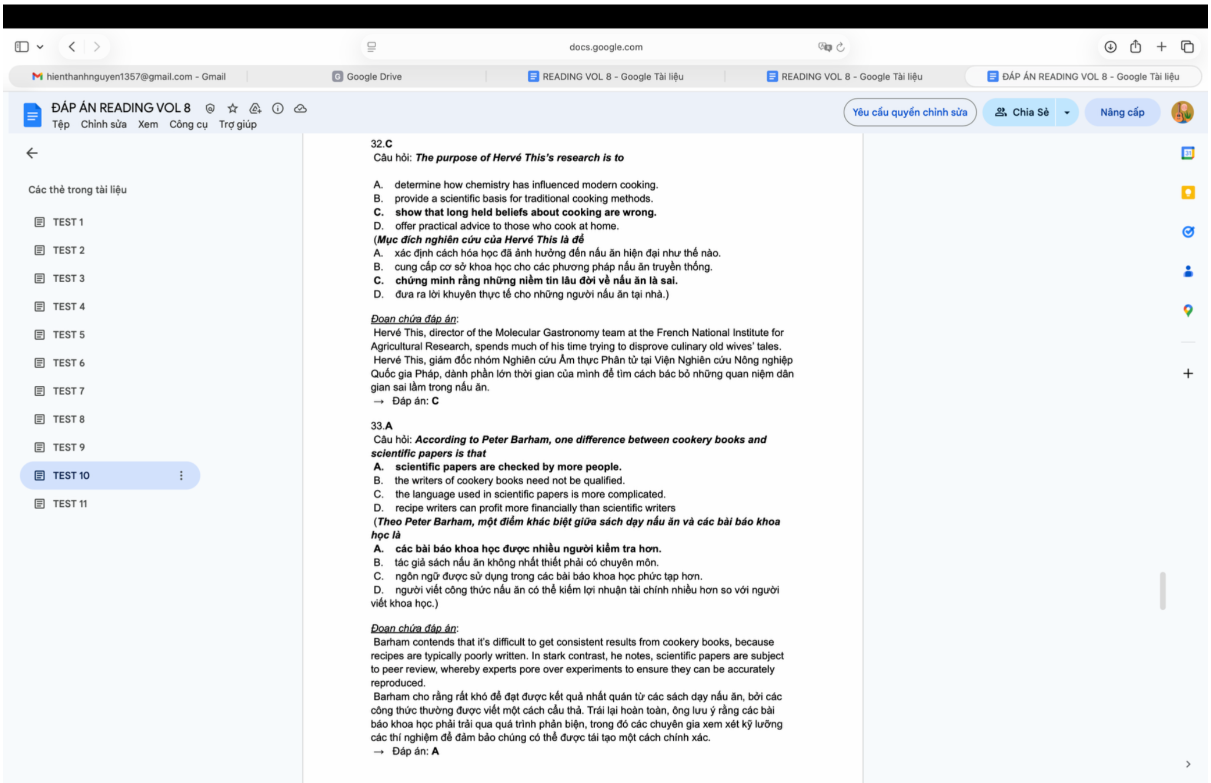
culturally ingrained cooking methods are less than perfect.
Bạn có thể thắc mắc rằng những truyền thống nấu ăn lâu đời thì có vấn đề gì. Thực tế là nhiều phương pháp nấu ăn ăn sâu trong văn hóa lại không thật sự hoàn hảo.
Giải thích: Khoa học hiện đại bác bỏ nhiều niềm tin nấu ăn truyền thống, không ủng hộ.
→ Đáp án: **NO**

29.**YES**
Câu hỏi: ***The food produced by Heston Blumenthal at The Fat Duck is unconventional.***
Đoạn chứa đáp án:
(Các món ăn do Heston Blumenthal tạo ra tại nhà hàng The Fat Duck là không theo lối truyền thống.)
The restaurant is widely regarded as one of the best in the world, serving delightfully unexpected dishes such as nitro scrambled egg and bacon ice cream.
Nhà hàng này được đánh giá rộng rãi là một trong những nhà hàng tốt nhất thế giới, phục vụ những món ăn đầy bất ngờ và thú vị như trứng đánh đông lạnh bằng nitơ và kem vị thịt xông khói.
→ Đáp án: **YES**

30.**NOT GIVEN**
Câu hỏi: ***El Bulli is the most popular restaurant of its kind in Spain.***
(El Bulli là nhà hàng nổi tiếng nhất cùng loại ở Tây Ban Nha.)
Đoạn chứa đáp án:
El Bulli in Catalonia, Spain – directed by chef Ferran Adrià – is another leading restaurant thus enthusiastically engaging with scientific techniques. It closes for six months of the year (to allow six months for research and development), yet is rumoured to be booked out for an entire year in advance.
El Bulli ở vùng Catalonia, Tây Ban Nha – do đầu bếp Ferran Adrià điều hành – là một nhà hàng hàng đầu khác cũng nhiệt tình áp dụng các kỹ thuật khoa học. Nhà hàng này đóng cửa sáu tháng mỗi năm (để dành sáu tháng cho việc nghiên cứu và phát triển), nhưng vẫn được đồn đoán là kín chỗ trước cho cả một năm.
Giải thích: Bài nói El Bulli rất nổi tiếng, nhưng không so sánh với các nhà hàng khác ở Tây Ban Nha
→ Đáp án: **NOT GIVEN**

31.**NOT GIVEN**
Câu hỏi: ***McGee has plans to open his own restaurant.***
(McGee có kế hoạch mở nhà hàng riêng của mình.)
Đoạn chứa đáp án:
In a revised edition, McGee says the book was "riding a rising wave of general interest in food, a wave that grew and grew, and knocked down the barriers between science and cooking, especially in the last decade
Trong lần tái bản, McGee cho biết cuốn sách của ông đã "đón đầu làn sóng quan tâm ngày càng gia tăng đối với ẩm thực, một làn sóng lớn dần lên và phá vỡ những rào cản giữa khoa học và nấu ăn, đặc biệt là trong thập kỷ vừa qua."
Giải thích: Bài chỉ nói McGee là tác giả/nhà khoa học thực phẩm, không hề đề cập đến việc ông mở nhà hàng.
→ Đáp án: **NOT GIVEN**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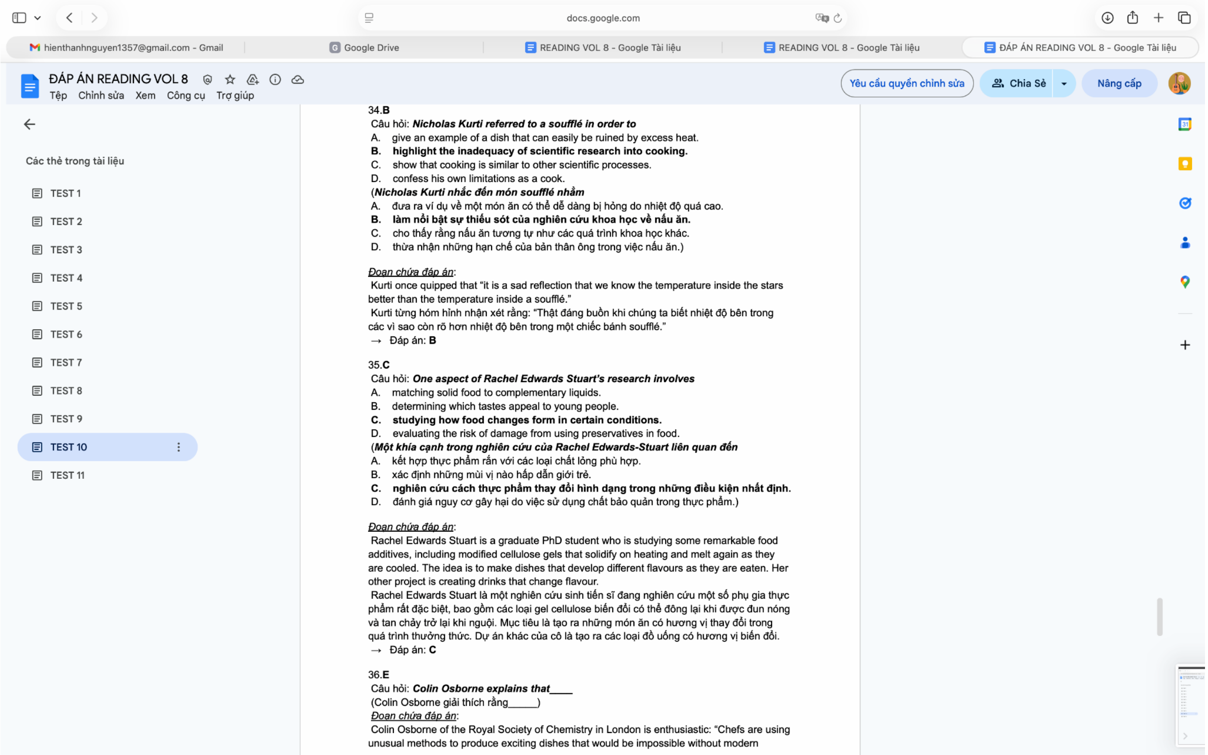
32.**C**
Câu hỏi: ***The purpose of Hervé This's research is to***

A. determine how chemistry has influenced modern cooking.
B. provide a scientific basis for traditional cooking methods.
C. show that long held beliefs about cooking are wrong.
D. offer practical advice to those who cook at home.
(***Mục đích nghiên cứu của Hervé This là để***
A. xác định cách hóa học đã ảnh hưởng đến nấu ăn hiện đại như thế nào.
B. cung cấp cơ sở khoa học cho các phương pháp nấu ăn truyền thống.
C. chứng minh rằng những niềm tin lâu đời về nấu ăn là sai.
D. đưa ra lời khuyên thực tế cho những người nấu ăn tại nhà.)

Đoạn chứa đáp án:
Hervé This, director of the Molecular Gastronomy team at the French National Institute for Agricultural Research, spends much of his time trying to disprove culinary old wives' tales.
Hervé This, giám đốc nhóm Nghiên cứu Ẩm thực Phân tử tại Viện Nghiên cứu Nông nghiệp Quốc gia Pháp, dành phần lớn thời gian của mình để tìm cách bác bỏ những quan niệm dân gian sai lầm trong nấu ăn.
→ Đáp án: **C**

33.**A**
Câu hỏi: ***According to Peter Barham, one difference between cookery books and scientific papers is that***
A. scientific papers are checked by more people.
B. the writers of cookery books need not be qualified.
C. the language used in scientific papers is more complicated.
D. recipe writers can profit more financially than scientific writers
(***Theo Peter Barham, một điểm khác biệt giữa sách dạy nấu ăn và các bài báo khoa học là***
A. các bài báo khoa học được nhiều người kiểm tra hơn.
B. tác giả sách nấu ăn không nhất thiết phải có chuyên môn.
C. ngôn ngữ được sử dụng trong các bài báo khoa học phức tạp hơn.
D. người viết công thức nấu ăn có thể kiếm lợi nhuận tài chính nhiều hơn so với người viết khoa học.)

Đoạn chứa đáp án:
Barham contends that it's difficult to get consistent results from cookery books, because recipes are typically poorly written. In stark contrast, he notes, scientific papers are subject to peer review, whereby experts pore over experiments to ensure they can be accurately reproduced.
Barham cho rằng rất khó để đạt được kết quả nhất quán từ các sách dạy nấu ăn, bởi các công thức thường được viết một cách cẩu thả. Trái lại hoàn toàn, ông lưu ý rằng các bài báo khoa học phải trải qua quá trình phản biện, trong đó các chuyên gia xem xét kỹ lưỡng các thí nghiệm để đảm bảo chúng có thể được tái tạo một cách chính xác.
→ Đáp án: **A**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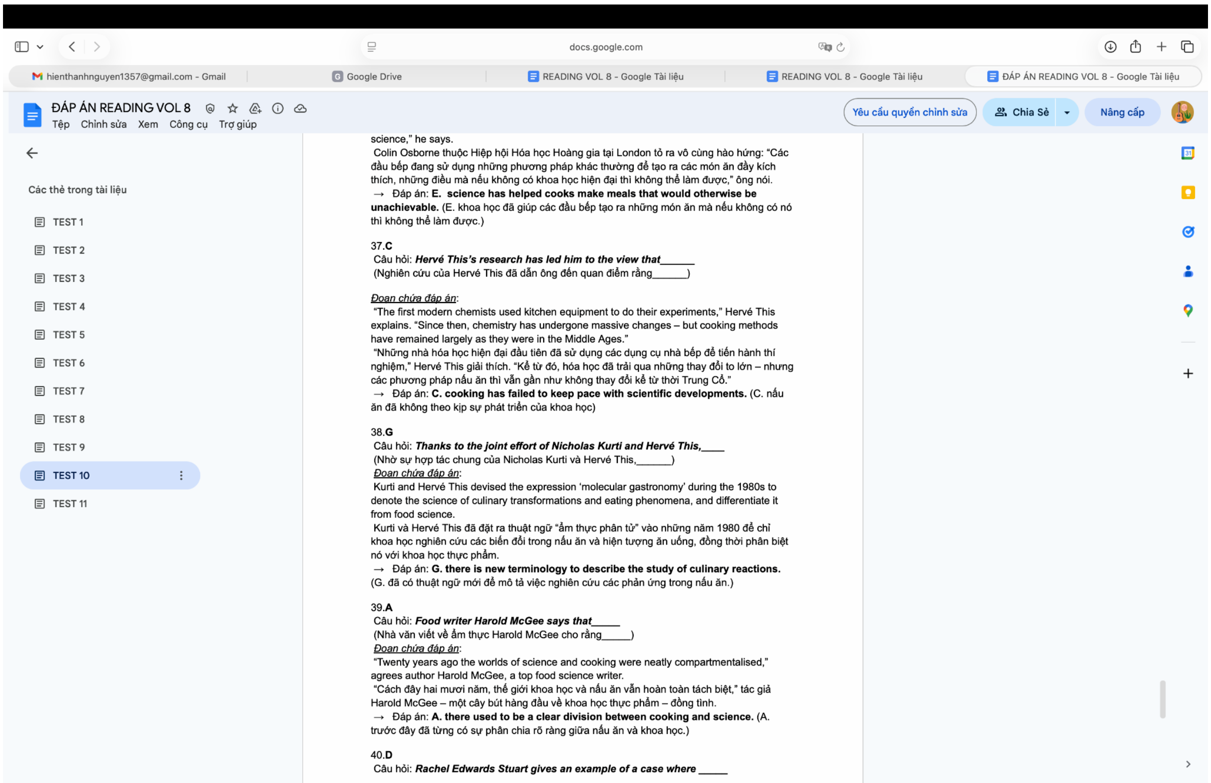
34.**B**
Câu hỏi: ***Nicholas Kurti referred to a soufflé in order to***
A. give an example of a dish that can easily be ruined by excess heat.
B. highlight the inadequacy of scientific research into cooking.
C. show that cooking is similar to other scientific processes.
D. confess his own limitations as a cook.
(***Nicholas Kurti nhắc đến món soufflé nhằm***
A. đưa ra ví dụ về một món ăn có thể dễ dàng bị hỏng do nhiệt độ quá cao.
B. làm nổi bật sự thiếu sót của nghiên cứu khoa học về nấu ăn.
C. cho thấy rằng nấu ăn tương tự như các quá trình khoa học khác.
D. thừa nhận những hạn chế của bản thân ông trong việc nấu ăn.)

Đoạn chứa đáp án:
Kurti once quipped that "it is a sad reflection that we know the temperature inside the stars better than the temperature inside a soufflé."
Kurti từng hóm hỉnh nhận xét rằng: "Thật đáng buồn khi chúng ta biết nhiệt độ bên trong các vì sao còn rõ hơn nhiệt độ bên trong một chiếc bánh soufflé."
→ Đáp án: **B**

35.**C**
Câu hỏi: ***One aspect of Rachel Edwards Stuart's research involves***
A. matching solid food to complementary liquids.
B. determining which tastes appeal to young people.
C. studying how food changes form in certain conditions.
D. evaluating the risk of damage from using preservatives in food.
(***Một khía cạnh trong nghiên cứu của Rachel Edwards-Stuart liên quan đến***
A. kết hợp thực phẩm rắn với các loại chất lỏng phù hợp.
B. xác định những mùi vị nào hấp dẫn giới trẻ.
C. nghiên cứu cách thực phẩm thay đổi hình dạng trong những điều kiện nhất định.
D. đánh giá nguy cơ gây hại do việc sử dụng chất bảo quản trong thực phẩm.)

Đoạn chứa đáp án:
Rachel Edwards Stuart is a graduate PhD student who is studying some remarkable food additives, including modified cellulose gels that solidify on heating and melt again as they are cooled. The idea is to make dishes that develop different flavours as they are eaten. Her other project is creating drinks that change flavour.
Rachel Edwards Stuart là một nghiên cứu sinh tiến sĩ đang nghiên cứu một số phụ gia thực phẩm rất đặc biệt, bao gồm các loại gel cellulose biến đổi có thể đông lại khi được đun nóng và tan chảy trở lại khi nguội. Mục tiêu là tạo ra những món ăn có hương vị thay đổi trong quá trình thưởng thức. Dự án khác của cô là tạo ra các loại đồ uống có hương vị biến đổi.
→ Đáp án: **C**

36.**E**
Câu hỏi: ***Colin Osborne explains that____***
(Colin Osborne giải thích rằng_____)
Đoạn chứa đáp án:
Colin Osborne of the Royal Society of Chemistry in London is enthusiastic: "Chefs are using unusual methods to produce exciting dishes that would be impossible without modern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science," he says.
Colin Osborne thuộc Hiệp hội Hóa học Hoàng gia tại London tỏ ra vô cùng hào hứng: "Các đầu bếp đang sử dụng những phương pháp khác thường để tạo ra các món ăn đầy kích thích, những điều mà nếu không có khoa học hiện đại thì không thể làm được," ông nói.
→ Đáp án: **E. science has helped cooks make meals that would otherwise be unachievable.** (E. khoa học đã giúp các đầu bếp tạo ra những món ăn mà nếu không có nó thì không thể làm được.)

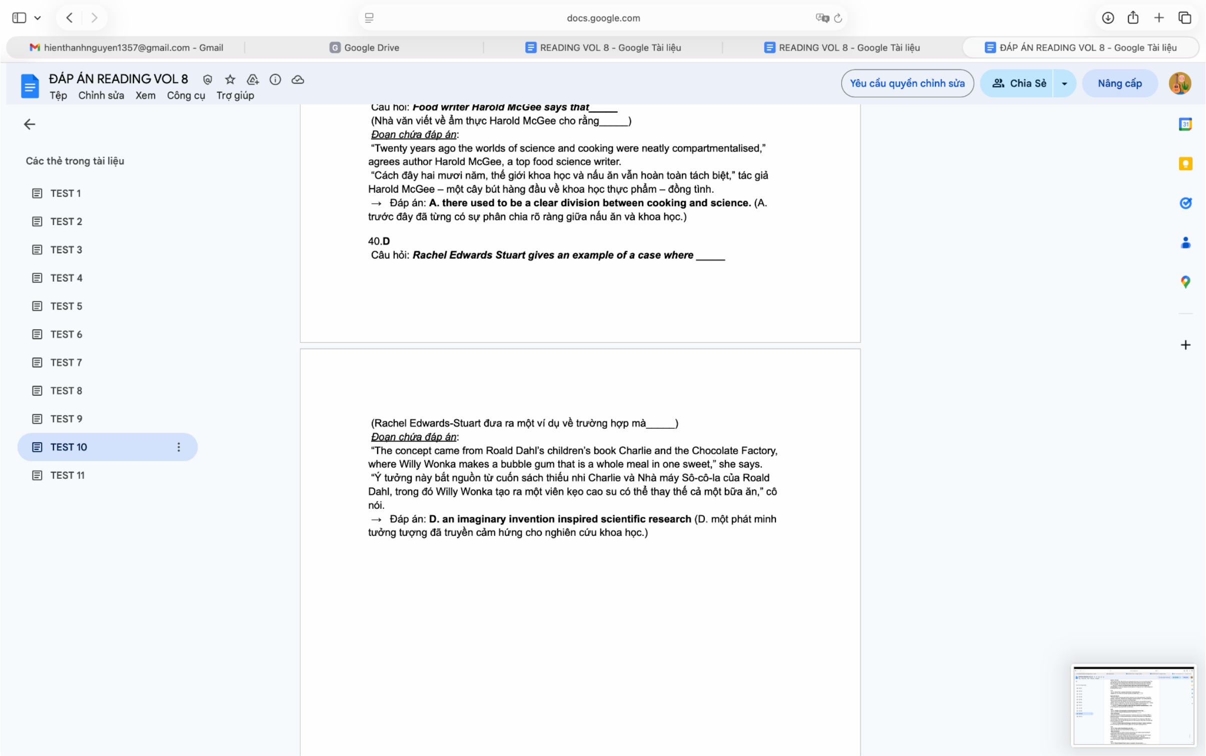
37.**C**
Câu hỏi: ***Hervé This's research has led him to the view that______***
(Nghiên cứu của Hervé This đã dẫn ông đến quan điểm rằng______)

Đoạn chứa đáp án:
"The first modern chemists used kitchen equipment to do their experiments," Hervé This explains. "Since then, chemistry has undergone massive changes – but cooking methods have remained largely as they were in the Middle Ages."
"Những nhà hóa học hiện đại đầu tiên đã sử dụng các dụng cụ nhà bếp để tiến hành thí nghiệm," Hervé This giải thích. "Kể từ đó, hóa học đã trải qua những thay đổi to lớn – nhưng các phương pháp nấu ăn thì vẫn gần như không thay đổi kể từ thời Trung Cổ."
→ Đáp án: **C. cooking has failed to keep pace with scientific developments.** (C. nấu ăn đã không theo kịp sự phát triển của khoa học)

38.**G**
Câu hỏi: ***Thanks to the joint effort of Nicholas Kurti and Hervé This,____***
(Nhờ sự hợp tác chung của Nicholas Kurti và Hervé This,______)
Đoạn chứa đáp án:
Kurti and Hervé This devised the expression 'molecular gastronomy' during the 1980s to denote the science of culinary transformations and eating phenomena, and differentiate it from food science.
Kurti và Hervé This đã đặt ra thuật ngữ "ẩm thực phân tử" vào những năm 1980 để chỉ khoa học nghiên cứu các biến đổi trong nấu ăn và hiện tượng ăn uống, đồng thời phân biệt nó với khoa học thực phẩm.
→ Đáp án: **G. there is new terminology to describe the study of culinary reactions.** (G. đã có thuật ngữ mới để mô tả việc nghiên cứu các phản ứng trong nấu ăn.)

39.**A**
Câu hỏi: ***Food writer Harold McGee says that_____***
(Nhà văn viết về ẩm thực Harold McGee cho rằng_____)
Đoạn chứa đáp án:
"Twenty years ago the worlds of science and cooking were neatly compartmentalised," agrees author Harold McGee, a top food science writer.
"Cách đây hai mươi năm, thế giới khoa học và nấu ăn vẫn hoàn toàn tách biệt," tác giả Harold McGee – một cây bút hàng đầu về khoa học thực phẩm – đồng tình.
→ Đáp án: **A. there used to be a clear division between cooking and science.** (A. trước đây đã từng có sự phân chia rõ ràng giữa nấu ăn và khoa học.)

40.**D**
Câu hỏi: ***Rachel Edwards Stuart gives an example of a case where _____***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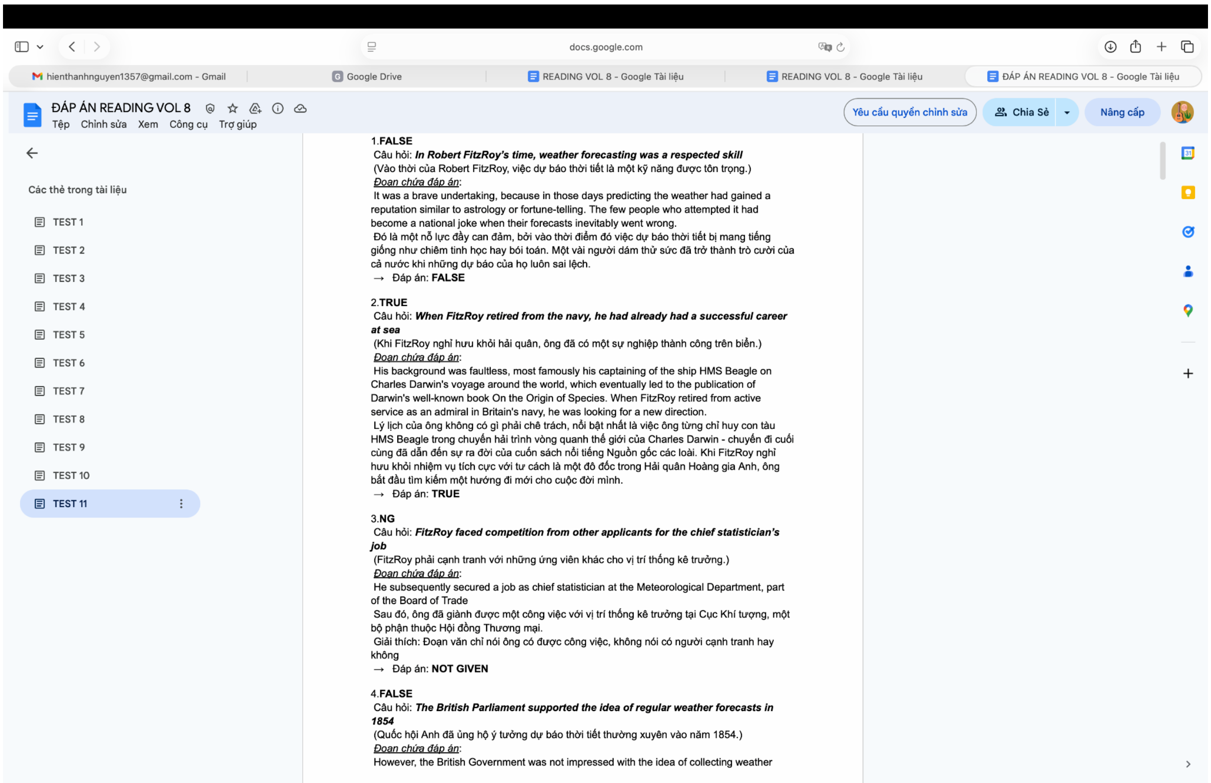
Câu hỏi: ***Food writer Harold McGee says that_____***
(Nhà văn viết về ẩm thực Harold McGee cho rằng_____)
Đoạn chứa đáp án:
"Twenty years ago the worlds of science and cooking were neatly compartmentalised," agrees author Harold McGee, a top food science writer.
"Cách đây hai mươi năm, thế giới khoa học và nấu ăn vẫn hoàn toàn tách biệt," tác giả Harold McGee – một cây bút hàng đầu về khoa học thực phẩm – đồng tình.
→ Đáp án: **A. there used to be a clear division between cooking and science.** (A. trước đây đã từng có sự phân chia rõ ràng giữa nấu ăn và khoa học.)

40.**D**
Câu hỏi: ***Rachel Edwards Stuart gives an example of a case where _____***

(Rachel Edwards-Stuart đưa ra một ví dụ về trường hợp mà_____)
Đoạn chứa đáp án:
"The concept came from Roald Dahl's children's book Charlie and the Chocolate Factory, where Willy Wonka makes a bubble gum that is a whole meal in one sweet," she says.
"Ý tưởng này bắt nguồn từ cuốn sách thiếu nhi Charlie và Nhà máy Sô-cô-la của Roald Dahl, trong đó Willy Wonka tạo ra một viên kẹo cao su có thể thay thế cả một bữa ăn," cô nói.
→ Đáp án: **D. an imaginary invention inspired scientific research** (D. một phát minh tưởng tượng đã truyền cảm hứng cho nghiên cứu khoa học.)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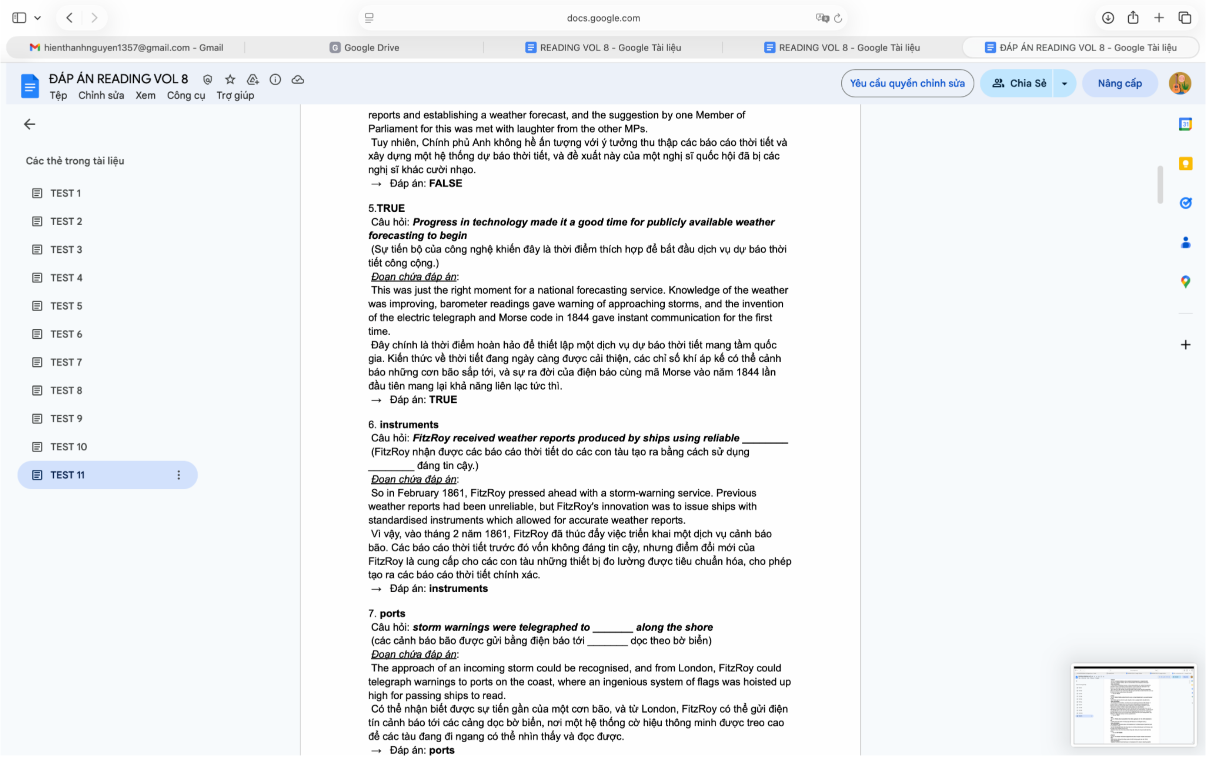
1.**FALSE**
Câu hỏi: ***In Robert FitzRoy's time, weather forecasting was a respected skill***
(Vào thời của Robert FitzRoy, việc dự báo thời tiết là một kỹ năng được tôn trọng.)
Đoạn chứa đáp án:
It was a brave undertaking, because in those days predicting the weather had gained a reputation similar to astrology or fortune-telling. The few people who attempted it had become a national joke when their forecasts inevitably went wrong.
Đó là một nỗ lực đầy can đảm, bởi vào thời điểm đó việc dự báo thời tiết bị mang tiếng giống như chiêm tinh học hay bói toán. Một vài người dám thử sức đã trở thành trò cười của cả nước khi những dự báo của họ luôn sai lệch.
→ Đáp án: **FALSE**

2.**TRUE**
Câu hỏi: ***When FitzRoy retired from the navy, he had already had a successful career at sea***
(Khi FitzRoy nghỉ hưu khỏi hải quân, ông đã có một sự nghiệp thành công trên biển.)
Đoạn chứa đáp án:
His background was faultless, most famously his captaining of the ship HMS Beagle on Charles Darwin's voyage around the world, which eventually led to the publication of Darwin's well-known book On the Origin of Species. When FitzRoy retired from active service as an admiral in Britain's navy, he was looking for a new direction.
Lý lịch của ông không có gì phải chê trách, nổi bật nhất là việc ông từng chỉ huy con tàu HMS Beagle trong chuyến hải trình vòng quanh thế giới của Charles Darwin - chuyến đi cuối cùng đã dẫn đến sự ra đời của cuốn sách nổi tiếng Nguồn gốc các loài. Khi FitzRoy nghỉ hưu khỏi nhiệm vụ tích cực với tư cách là một đô đốc trong Hải quân Hoàng gia Anh, ông bắt đầu tìm kiếm một hướng đi mới cho cuộc đời mình.
→ Đáp án: **TRUE**

3.**NG**
Câu hỏi: ***FitzRoy faced competition from other applicants for the chief statistician's job***
(FitzRoy phải cạnh tranh với những ứng viên khác cho vị trí thống kê trưởng.)
Đoạn chứa đáp án:
He subsequently secured a job as chief statistician at the Meteorological Department, part of the Board of Trade
Sau đó, ông đã giành được một công việc với vị trí thống kê trưởng tại Cục Khí tượng, một bộ phận thuộc Hội đồng Thương mại.
Giải thích: Đoạn văn chỉ nói ông có được công việc, không nói có người cạnh tranh hay không
→ Đáp án: **NOT GIVEN**

4.**FALSE**
Câu hỏi: ***The British Parliament supported the idea of regular weather forecasts in 1854***
(Quốc hội Anh đã ủng hộ ý tưởng dự báo thời tiết thường xuyên vào năm 1854.)
Đoạn chứa đáp án:
However, the British Government was not impressed with the idea of collecting weather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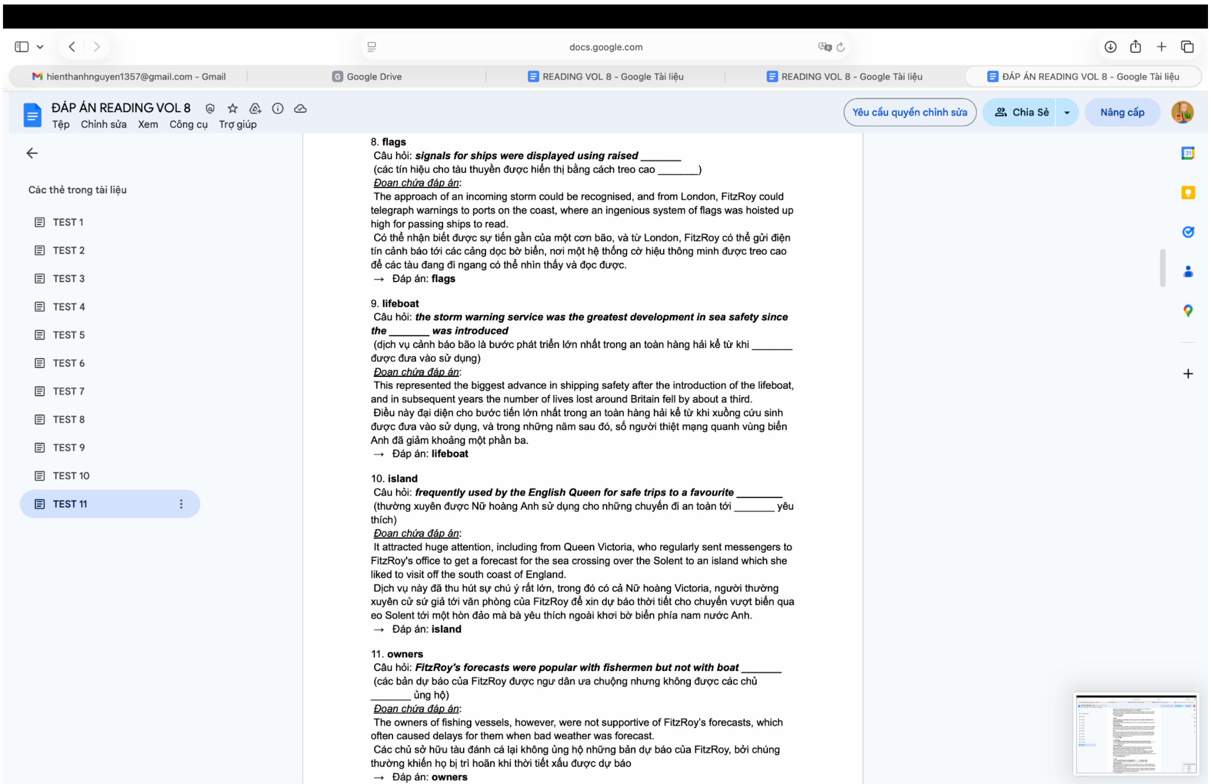
reports and establishing a weather forecast, and the suggestion by one Member of Parliament for this was met with laughter from the other MPs.
Tuy nhiên, Chính phủ Anh không hề ấn tượng với ý tưởng thu thập các báo cáo thời tiết và xây dựng một hệ thống dự báo thời tiết, và đề xuất này của một nghị sĩ quốc hội đã bị các nghị sĩ khác cười nhạo.
→ Đáp án: **FALSE**

5.**TRUE**
Câu hỏi: ***Progress in technology made it a good time for publicly available weather forecasting to begin***
(Sự tiến bộ của công nghệ khiến đây là thời điểm thích hợp để bắt đầu dịch vụ dự báo thời tiết công cộng.)
Đoạn chứa đáp án:
This was just the right moment for a national forecasting service. Knowledge of the weather was improving, barometer readings gave warning of approaching storms, and the invention of the electric telegraph and Morse code in 1844 gave instant communication for the first time.
Đây chính là thời điểm hoàn hảo để thiết lập một dịch vụ dự báo thời tiết mang tầm quốc gia. Kiến thức về thời tiết đang ngày càng được cải thiện, các chỉ số khí áp kế có thể cảnh báo những cơn bão sắp tới, và sự ra đời của điện báo cùng mã Morse vào năm 1844 lần đầu tiên mang lại khả năng liên lạc tức thì.
→ Đáp án: **TRUE**

6. **instruments**
Câu hỏi: ***FitzRoy received weather reports produced by ships using reliable _________***
(FitzRoy nhận được các báo cáo thời tiết do các con tàu tạo ra bằng cách sử dụng _________ đáng tin cậy.)
Đoạn chứa đáp án:
So in February 1861, FitzRoy pressed ahead with a storm-warning service. Previous weather reports had been unreliable, but FitzRoy's innovation was to issue ships with standardised instruments which allowed for accurate weather reports.
Vì vậy, vào tháng 2 năm 1861, FitzRoy đã thúc đẩy việc triển khai một dịch vụ cảnh báo bão. Các báo cáo thời tiết trước đó vốn không đáng tin cậy, nhưng điểm đổi mới của FitzRoy là cung cấp cho các con tàu những thiết bị đo lường được tiêu chuẩn hóa, cho phép tạo ra các báo cáo thời tiết chính xác.
→ Đáp án: **instruments**

7. **ports**
Câu hỏi: ***storm warnings were telegraphed to ________ along the shore***
(các cảnh báo bão được gửi bằng điện báo tới ________ dọc theo bờ biển)
Đoạn chứa đáp án:
The approach of an incoming storm could be recognised, and from London, FitzRoy could telegraph warnings to ports on the coast, where an ingenious system of flags was hoisted up high for passing ships to read.
Có thể nhận biết được sự tiến gần của một cơn bão, và từ London, FitzRoy có thể gửi điện tín cảnh báo tới các cảng dọc bờ biển, nơi một hệ thống cờ hiệu thông minh được treo cao để các tàu đang đi ngang có thể nhìn thấy và đọc được.
→ Đáp án: **ports**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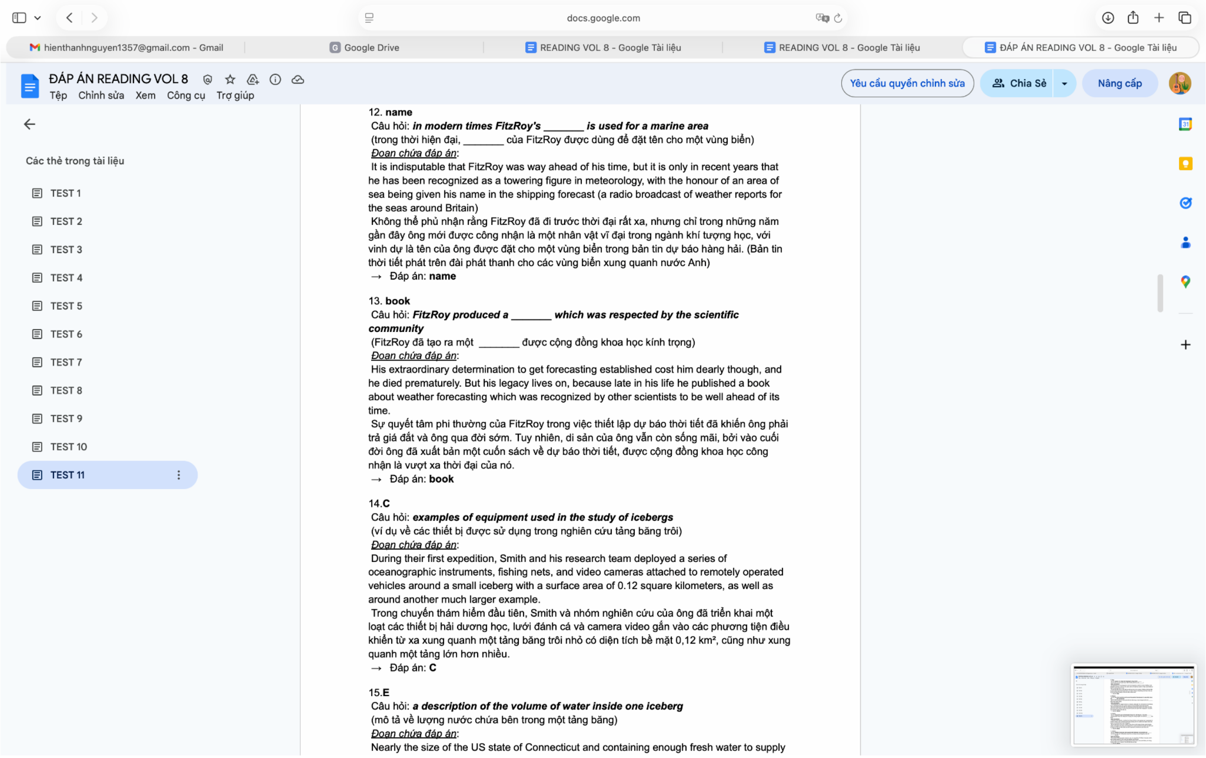
8. **flags**
Câu hỏi: ***signals for ships were displayed using raised _______***
(các tín hiệu cho tàu thuyền được hiển thị bằng cách treo cao _______)
Đoạn chứa đáp án:
The approach of an incoming storm could be recognised, and from London, FitzRoy could telegraph warnings to ports on the coast, where an ingenious system of flags was hoisted up high for passing ships to read.
Có thể nhận biết được sự tiến gần của một cơn bão, và từ London, FitzRoy có thể gửi điện tín cảnh báo tới các cảng dọc bờ biển, nơi một hệ thống cờ hiệu thông minh được treo cao để các tàu đang đi ngang có thể nhìn thấy và đọc được.
→ Đáp án: **flags**

9. **lifeboat**
Câu hỏi: ***the storm warning service was the greatest development in sea safety since the _______ was introduced***
(dịch vụ cảnh báo bão là bước phát triển lớn nhất trong an toàn hàng hải kể từ khi _______ được đưa vào sử dụng)
Đoạn chứa đáp án:
This represented the biggest advance in shipping safety after the introduction of the lifeboat, and in subsequent years the number of lives lost around Britain fell by about a third.
Điều này đại diện cho bước tiến lớn nhất trong an toàn hàng hải kể từ khi xuồng cứu sinh được đưa vào sử dụng, và trong những năm sau đó, số người thiệt mạng quanh vùng biển Anh đã giảm khoảng một phần ba.
→ Đáp án: **lifeboat**

10. **island**
Câu hỏi: ***frequently used by the English Queen for safe trips to a favourite _______***
(thường xuyên được Nữ hoàng Anh sử dụng cho những chuyến đi an toàn tới _______ yêu thích)
Đoạn chứa đáp án:
It attracted huge attention, including from Queen Victoria, who regularly sent messengers to FitzRoy's office to get a forecast for the sea crossing over the Solent to an island which she liked to visit off the south coast of England.
Dịch vụ này đã thu hút sự chú ý rất lớn, trong đó có cả Nữ hoàng Victoria, người thường xuyên cử sứ giả tới văn phòng của FitzRoy để xin dự báo thời tiết cho chuyến vượt biển qua eo Solent tới một hòn đảo mà bà yêu thích ngoài khơi bờ biển phía nam nước Anh.
→ Đáp án: **island**

11. **owners**
Câu hỏi: ***FitzRoy's forecasts were popular with fishermen but not with boat _______***
(các bản dự báo của FitzRoy được ngư dân ưa chuộng nhưng không được các chủ _______ ủng hộ)
Đoạn chứa đáp án:
The owners of fishing vessels, however, were not supportive of FitzRoy's forecasts, which often caused delays for them when bad weather was forecast.
Các chủ sở hữu tàu đánh cá lại không ủng hộ những bản dự báo của FitzRoy, bởi chúng thường khiến họ bị trì hoãn khi thời tiết xấu được dự báo
→ Đáp án: **owners**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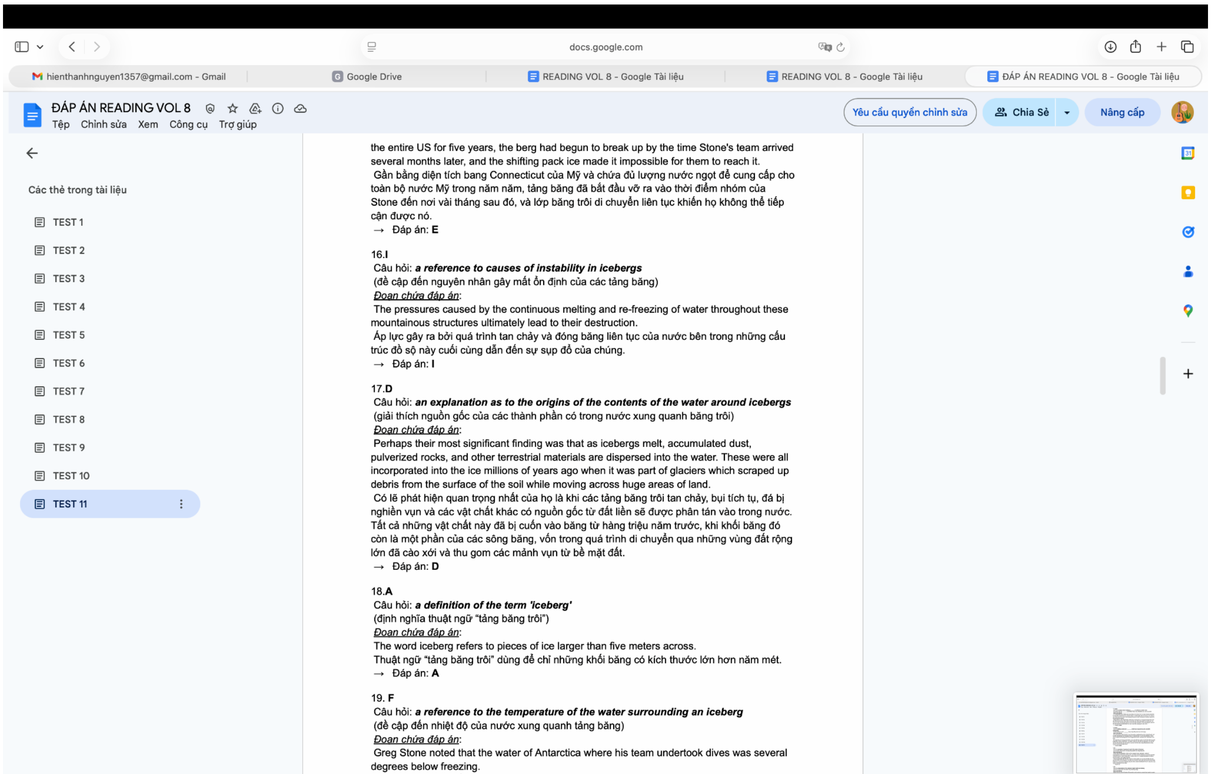
12. **name**
Câu hỏi: ***in modern times FitzRoy's _______ is used for a marine area***
(trong thời hiện đại, _______ của FitzRoy được dùng để đặt tên cho một vùng biển)
Đoạn chứa đáp án:
It is indisputable that FitzRoy was way ahead of his time, but it is only in recent years that he has been recognized as a towering figure in meteorology, with the honour of an area of sea being given his name in the shipping forecast (a radio broadcast of weather reports for the seas around Britain)
Không thể phủ nhận rằng FitzRoy đã đi trước thời đại rất xa, nhưng chỉ trong những năm gần đây ông mới được công nhận là một nhân vật vĩ đại trong ngành khí tượng học, với vinh dự là tên của ông được đặt cho một vùng biển trong bản tin dự báo hàng hải. (Bản tin thời tiết phát trên đài phát thanh cho các vùng biển xung quanh nước Anh)
→ Đáp án: **name**

13. **book**
Câu hỏi: ***FitzRoy produced a _______ which was respected by the scientific community***
(FitzRoy đã tạo ra một _______ được cộng đồng khoa học kính trọng)
Đoạn chứa đáp án:
His extraordinary determination to get forecasting established cost him dearly though, and he died prematurely. But his legacy lives on, because late in his life he published a book about weather forecasting which was recognized by other scientists to be well ahead of its time.
Sự quyết tâm phi thường của FitzRoy trong việc thiết lập dự báo thời tiết đã khiến ông phải trả giá đắt và ông qua đời sớm. Tuy nhiên, di sản của ông vẫn còn sống mãi, bởi vào cuối đời ông đã xuất bản một cuốn sách về dự báo thời tiết, được cộng đồng khoa học công nhận là vượt xa thời đại của nó.
→ Đáp án: **book**

14.**C**
Câu hỏi: ***examples of equipment used in the study of icebergs***
(ví dụ về các thiết bị được sử dụng trong nghiên cứu tảng băng trôi)
Đoạn chứa đáp án:
During their first expedition, Smith and his research team deployed a series of oceanographic instruments, fishing nets, and video cameras attached to remotely operated vehicles around a small iceberg with a surface area of 0.12 square kilometers, as well as around another much larger example.
Trong chuyến thám hiểm đầu tiên, Smith và nhóm nghiên cứu của ông đã triển khai một loạt các thiết bị hải dương học, lưới đánh cá và camera video gắn vào các phương tiện điều khiển từ xa xung quanh một tảng băng trôi nhỏ có diện tích bề mặt 0,12 km^2, cũng như xung quanh một tảng lớn hơn nhiều.
→ Đáp án: **C**

15.**E**
Câu hỏi: ***a description of the volume of water inside one iceberg***
(mô tả về lượng nước chứa bên trong một tảng băng)
Đoạn chứa đáp án:
Nearly the size of the US state of Connecticut and containing enough fresh water to supply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the entire US for five years, the berg had begun to break up by the time Stone's team arrived several months later, and the shifting pack ice made it impossible for them to reach it.

Gần bằng diện tích bang Connecticut của Mỹ và chứa đủ lượng nước ngọt để cung cấp cho toàn bộ nước Mỹ trong năm năm, tảng băng đã bắt đầu vỡ ra vào thời điểm nhóm của Stone đến nơi vài tháng sau đó, và lớp băng trôi di chuyển liên tục khiến họ không thể tiếp cận được nó.

→ Đáp án: **E**

16.**I**

Câu hỏi: ***a reference to causes of instability in icebergs***

(đề cập đến nguyên nhân gây mất ổn định của các tảng băng)

Đoạn chứa đáp án:

The pressures caused by the continuous melting and re-freezing of water throughout these mountainous structures ultimately lead to their destruction.

Áp lực gây ra bởi quá trình tan chảy và đóng băng liên tục của nước bên trong những cấu trúc đồ sộ này cuối cùng dẫn đến sự sụp đổ của chúng.

→ Đáp án: **I**

17.**D**

Câu hỏi: ***an explanation as to the origins of the contents of the water around icebergs***

(giải thích nguồn gốc của các thành phần có trong nước xung quanh băng trôi)

Đoạn chứa đáp án:

Perhaps their most significant finding was that as icebergs melt, accumulated dust, pulverized rocks, and other terrestrial materials are dispersed into the water. These were all incorporated into the ice millions of years ago when it was part of glaciers which scraped up debris from the surface of the soil while moving across huge areas of land.

Có lẽ phát hiện quan trọng nhất của họ là khi các tảng băng trôi tan chảy, bụi tích tụ, đá bị nghiền vụn và các vật chất khác có nguồn gốc từ đất liền sẽ được phân tán vào trong nước. Tất cả những vật chất này đã bị cuốn vào băng từ hàng triệu năm trước, khi khối băng đó còn là một phần của các sông băng, vốn trong quá trình di chuyển qua những vùng đất rộng lớn đã cào xới và thu gom các mảnh vụn từ bề mặt đất.

→ Đáp án: **D**

18.**A**

Câu hỏi: ***a definition of the term 'iceberg'***

(định nghĩa thuật ngữ “tảng băng trôi”)

Đoạn chứa đáp án:

The word iceberg refers to pieces of ice larger than five meters across.

Thuật ngữ “tảng băng trôi” dùng để chỉ những khối băng có kích thước lớn hơn năm mét.

→ Đáp án: **A**

19. **F**

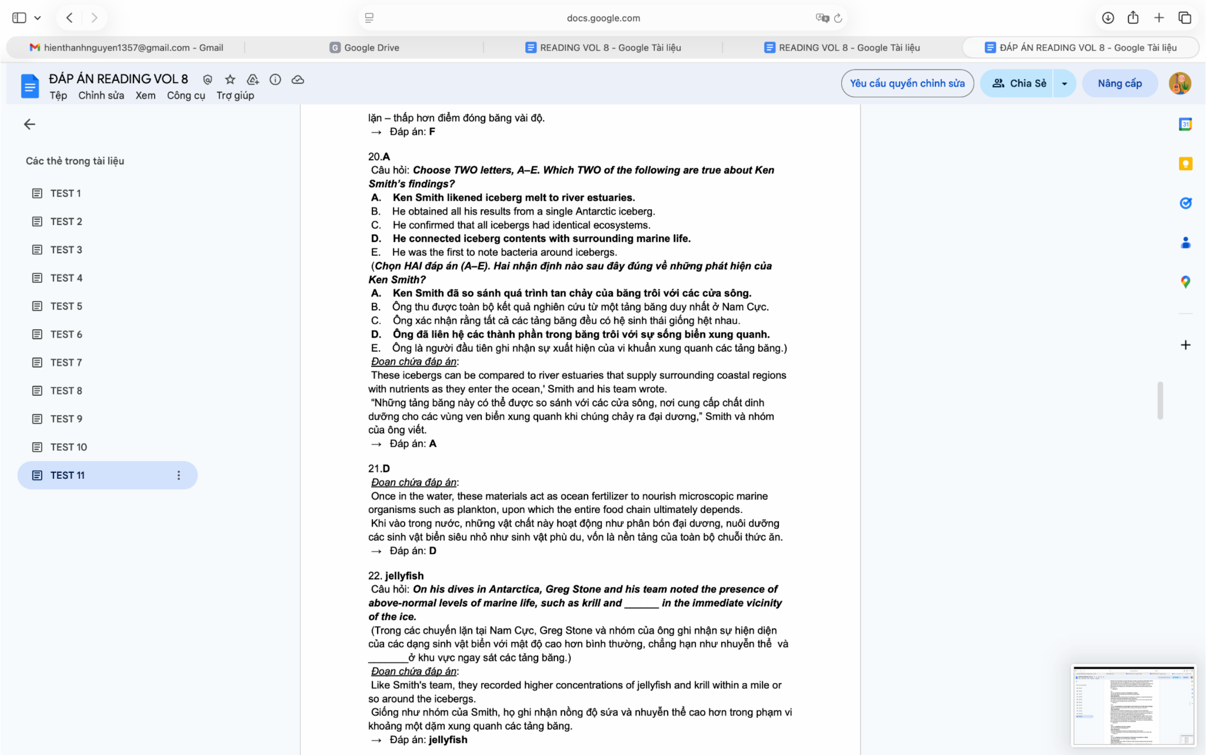
Câu hỏi: ***a reference to the temperature of the water surrounding an iceberg***

(đề cập đến nhiệt độ của nước xung quanh tảng băng)

Đoạn chứa đáp án:

Greg Stone noted that the water of Antarctica where his team undertook dives was several degrees below freezing.

Greg Stone lưu ý rằng nhiệt độ nước ở Nam Cực – nơi nhóm của ông thực hiện các cuộc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lặn – thấp hơn điểm đóng băng vài độ.

→ Đáp án: **F**

20.**A**

Câu hỏi: ***Choose TWO letters, A–E. Which TWO of the following are true about Ken Smith’s findings?***

A. Ken Smith likened iceberg melt to river estuaries.
B. He obtained all his results from a single Antarctic iceberg.
C. He confirmed that all icebergs had identical ecosystems.
D. He connected iceberg contents with surrounding marine life.
E. He was the first to note bacteria around icebergs.

(***Chọn HAI đáp án (A–E). Hai nhận định nào sau đây đúng về những phát hiện của Ken Smith?***

A. Ken Smith đã so sánh quá trình tan chảy của băng trôi với các cửa sông.
B. Ông thu được toàn bộ kết quả nghiên cứu từ một tảng băng duy nhất ở Nam Cực.
C. Ông xác nhận rằng tất cả các tảng băng đều có hệ sinh thái giống hệt nhau.
D. Ông đã liên hệ các thành phần trong băng trôi với sự sống biển xung quanh.
E. Ông là người đầu tiên ghi nhận sự xuất hiện của vi khuẩn xung quanh các tảng băng.)

Đoạn chứa đáp án:

These icebergs can be compared to river estuaries that supply surrounding coastal regions with nutrients as they enter the ocean,' Smith and his team wrote.

“Những tảng băng này có thể được so sánh với các cửa sông, nơi cung cấp chất dinh dưỡng cho các vùng ven biển xung quanh khi chúng chảy ra đại dương,” Smith và nhóm của ông viết.

→ Đáp án: **A**

21.**D**

Đoạn chứa đáp án:

Once in the water, these materials act as ocean fertilizer to nourish microscopic marine organisms such as plankton, upon which the entire food chain ultimately depends.

Khi vào trong nước, những vật chất này hoạt động như phân bón đại dương, nuôi dưỡng các sinh vật biển siêu nhỏ như sinh vật phù du, vốn là nền tảng của toàn bộ chuỗi thức ăn.

→ Đáp án: **D**

22. **jellyfish**

Câu hỏi: ***On his dives in Antarctica, Greg Stone and his team noted the presence of above-normal levels of marine life, such as krill and ______ in the immediate vicinity of the ice.***

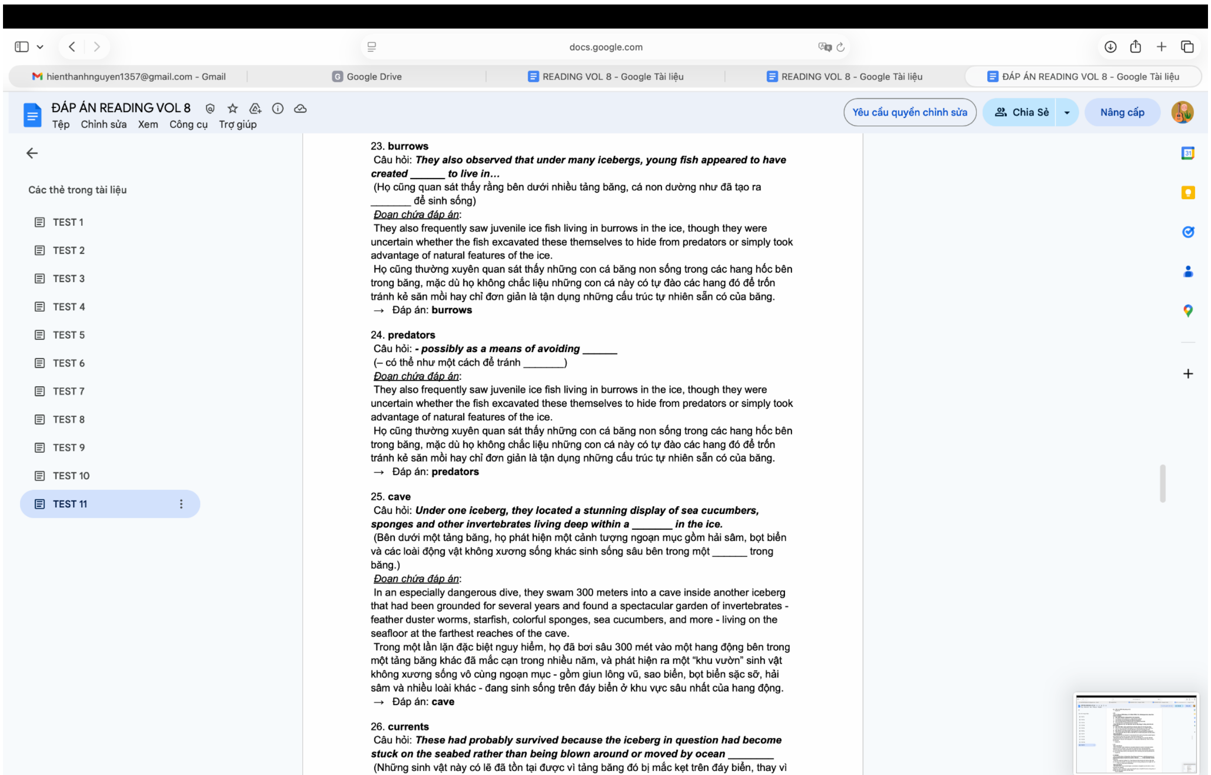
(Trong các chuyến lặn tại Nam Cực, Greg Stone và nhóm của ông ghi nhận sự hiện diện của các dạng sinh vật biển với mật độ cao hơn bình thường, chẳng hạn như nhuyễn thể và _______ở khu vực ngay sát các tảng băng.)

Đoạn chứa đáp án:

Like Smith's team, they recorded higher concentrations of jellyfish and krill within a mile or so around the icebergs.

Giống như nhóm của Smith, họ ghi nhận nồng độ sứa và nhuyễn thể cao hơn trong phạm vi khoảng một dặm xung quanh các tảng băng.

→ Đáp án: **jellyfish**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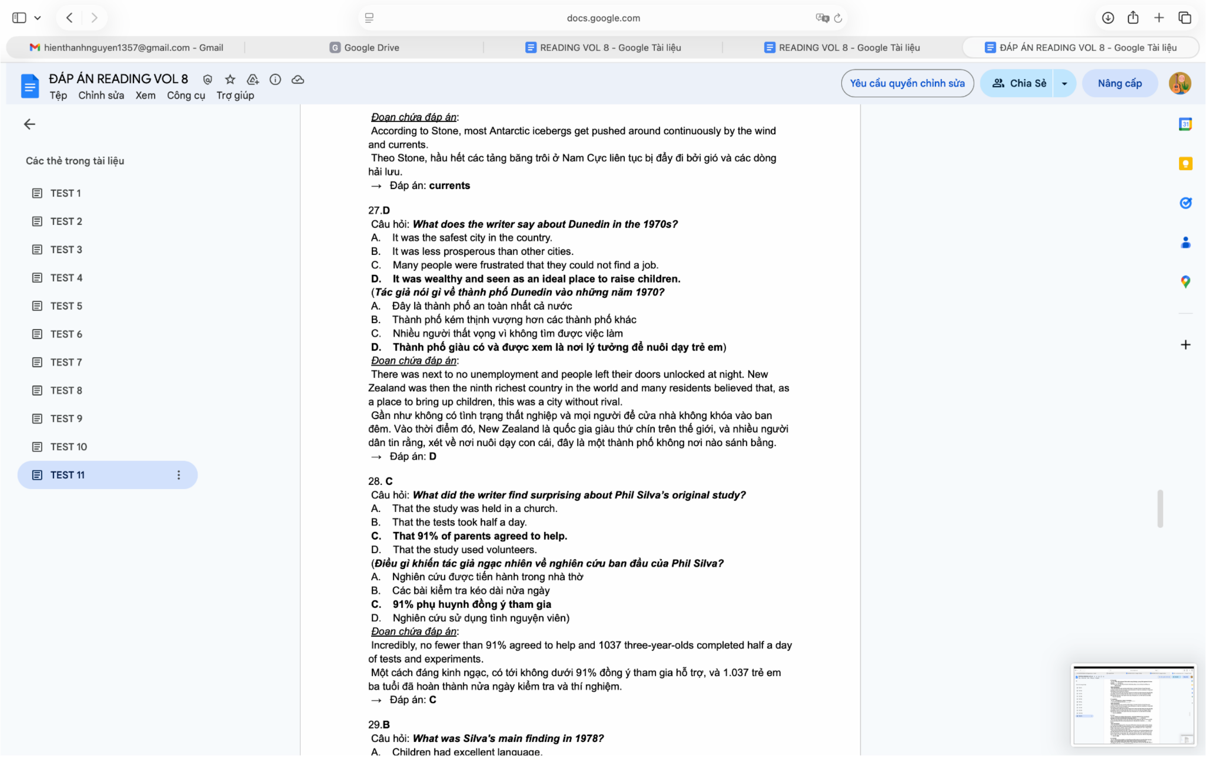
23. **burrows**
Câu hỏi: ***They also observed that under many icebergs, young fish appeared to have created ______ to live in…***
(Họ cũng quan sát thấy rằng bên dưới nhiều tảng băng, cá non dường như đã tạo ra _______ để sinh sống)
Đoạn chứa đáp án:
They also frequently saw juvenile ice fish living in burrows in the ice, though they were uncertain whether the fish excavated these themselves to hide from predators or simply took advantage of natural features of the ice.
Họ cũng thường xuyên quan sát thấy những con cá băng non sống trong các hang hốc bên trong băng, mặc dù họ không chắc liệu những con cá này có tự đào các hang đó để trốn tránh kẻ săn mồi hay chỉ đơn giản là tận dụng những cấu trúc tự nhiên sẵn có của băng.
→ Đáp án: **burrows**

24. **predators**
Câu hỏi: ***- possibly as a means of avoiding ______***
(– có thể như một cách để tránh _______)
Đoạn chứa đáp án:
They also frequently saw juvenile ice fish living in burrows in the ice, though they were uncertain whether the fish excavated these themselves to hide from predators or simply took advantage of natural features of the ice.
Họ cũng thường xuyên quan sát thấy những con cá băng non sống trong các hang hốc bên trong băng, mặc dù họ không chắc liệu những con cá này có tự đào các hang đó để trốn tránh kẻ săn mồi hay chỉ đơn giản là tận dụng những cấu trúc tự nhiên sẵn có của băng.
→ Đáp án: **predators**

25. **cave**
Câu hỏi: ***Under one iceberg, they located a stunning display of sea cucumbers, sponges and other invertebrates living deep within a _______ in the ice.***
(Bên dưới một tảng băng, họ phát hiện một cảnh tượng ngoạn mục gồm hải sâm, bọt biển và các loài động vật không xương sống khác sinh sống sâu bên trong một ______ trong băng.)
Đoạn chứa đáp án:
In an especially dangerous dive, they swam 300 meters into a cave inside another iceberg that had been grounded for several years and found a spectacular garden of invertebrates - feather duster worms, starfish, colorful sponges, sea cucumbers, and more - living on the seafloor at the farthest reaches of the cave.
Trong một lần lặn đặc biệt nguy hiểm, họ đã bơi sâu 300 mét vào một hang động bên trong một tảng băng khác đã mắc cạn trong nhiều năm, và phát hiện ra một “khu vườn” sinh vật không xương sống vô cùng ngoạn mục - gồm giun lông vũ, sao biển, bọt biển sặc sỡ, hải sâm và nhiều loài khác - đang sinh sống trên đáy biển ở khu vực sâu nhất của hang động.
→ Đáp án: **cave**

26. **currents**
Câu hỏi: ***These had probably survived because the iceberg in question had become stuck on the seabed rather than being blown around or moved by ocean ________***
(Những sinh vật này có lẽ đã tồn tại được vì tảng băng đó bị mắc kẹt trên đáy biển, thay vì bị gió thổi hoặc bị các ________ đại dương đẩy đi.)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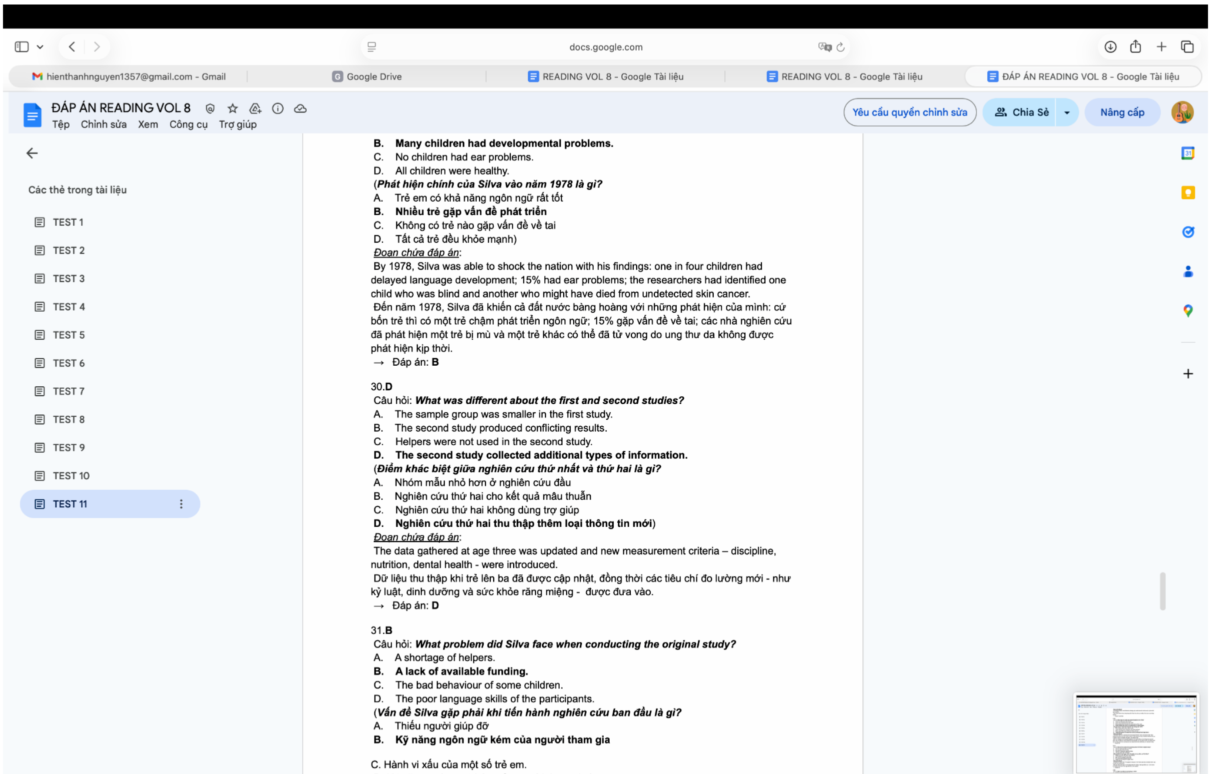
Đoạn chứa đáp án:
According to Stone, most Antarctic icebergs get pushed around continuously by the wind and currents.
Theo Stone, hầu hết các tảng băng trôi ở Nam Cực liên tục bị đẩy đi bởi gió và các dòng hải lưu.
→ Đáp án: **currents**

27.**D**
Câu hỏi: ***What does the writer say about Dunedin in the 1970s?***
A. It was the safest city in the country.
B. It was less prosperous than other cities.
C. Many people were frustrated that they could not find a job.
D. It was wealthy and seen as an ideal place to raise children.
(***Tác giả nói gì về thành phố Dunedin vào những năm 1970?***
A. Đây là thành phố an toàn nhất cả nước
B. Thành phố kém thịnh vượng hơn các thành phố khác
C. Nhiều người thất vọng vì không tìm được việc làm
D. Thành phố giàu có và được xem là nơi lý tưởng để nuôi dạy trẻ em)
Đoạn chứa đáp án:
There was next to no unemployment and people left their doors unlocked at night. New Zealand was then the ninth richest country in the world and many residents believed that, as a place to bring up children, this was a city without rival.
Gần như không có tình trạng thất nghiệp và mọi người để cửa nhà không khóa vào ban đêm. Vào thời điểm đó, New Zealand là quốc gia giàu thứ chín trên thế giới, và nhiều người dân tin rằng, xét về nơi nuôi dạy con cái, đây là một thành phố không nơi nào sánh bằng.
→ Đáp án: **D**

28. **C**
Câu hỏi: ***What did the writer find surprising about Phil Silva’s original study?***
A. That the study was held in a church.
B. That the tests took half a day.
C. That 91% of parents agreed to help.
D. That the study used volunteers.
(***Điều gì khiến tác giả ngạc nhiên về nghiên cứu ban đầu của Phil Silva?***
A. Nghiên cứu được tiến hành trong nhà thờ
B. Các bài kiểm tra kéo dài nửa ngày
C. 91% phụ huynh đồng ý tham gia
D. Nghiên cứu sử dụng tình nguyện viên)
Đoạn chứa đáp án:
Incredibly, no fewer than 91% agreed to help and 1037 three-year-olds completed half a day of tests and experiments.
Một cách đáng kinh ngạc, có tới không dưới 91% đồng ý tham gia hỗ trợ, và 1.037 trẻ em ba tuổi đã hoàn thành nửa ngày kiểm tra và thí nghiệm.
→ Đáp án: **C**

29.**B**
Câu hỏi: ***What was Silva's main finding in 1978?***
A. Children had excellent language.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B. Many children had developmental problems.
C. No children had ear problems.
D. All children were healthy.
(***Phát hiện chính của Silva vào năm 1978 là gì?***
A. Trẻ em có khả năng ngôn ngữ rất tốt
B. Nhiều trẻ gặp vấn đề phát triển
C. Không có trẻ nào gặp vấn đề về tai
D. Tất cả trẻ đều khỏe mạnh)

Đoạn chứa đáp án:

By 1978, Silva was able to shock the nation with his findings: one in four children had delayed language development; 15% had ear problems; the researchers had identified one child who was blind and another who might have died from undetected skin cancer.

Đến năm 1978, Silva đã khiến cả đất nước bàng hoàng với những phát hiện của mình: cứ bốn trẻ thì có một trẻ chậm phát triển ngôn ngữ; 15% gặp vấn đề về tai; các nhà nghiên cứu đã phát hiện một trẻ bị mù và một trẻ khác có thể đã tử vong do ung thư da không được phát hiện kịp thời.

→ Đáp án: **B**

30.**D**
Câu hỏi: ***What was different about the first and second studies?***
A. The sample group was smaller in the first study.
B. The second study produced conflicting results.
C. Helpers were not used in the second study.
D. The second study collected additional types of information.
(***Điểm khác biệt giữa nghiên cứu thứ nhất và thứ hai là gì?***
A. Nhóm mẫu nhỏ hơn ở nghiên cứu đầu
B. Nghiên cứu thứ hai cho kết quả mâu thuẫn
C. Nghiên cứu thứ hai không dùng trợ giúp
D. Nghiên cứu thứ hai thu thập thêm loại thông tin mới)

Đoạn chứa đáp án:

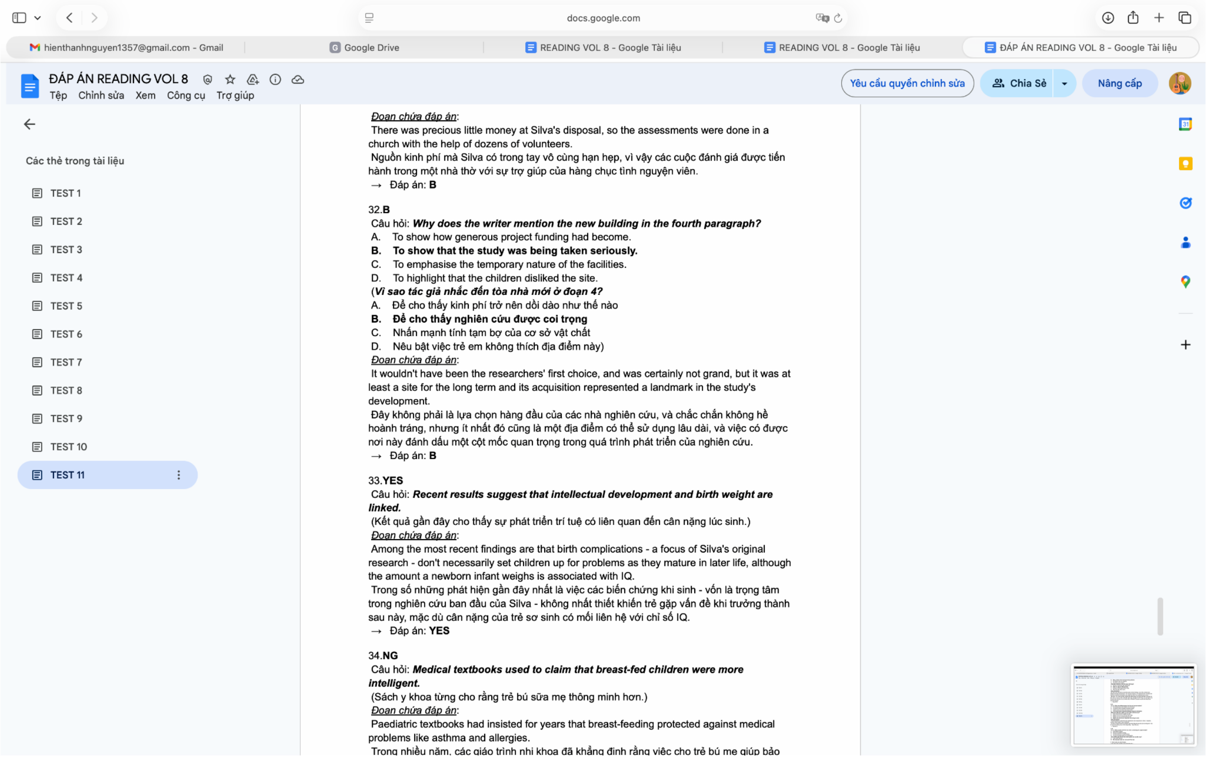
The data gathered at age three was updated and new measurement criteria – discipline, nutrition, dental health - were introduced.

Dữ liệu thu thập khi trẻ lên ba đã được cập nhật, đồng thời các tiêu chí đo lường mới - như kỷ luật, dinh dưỡng và sức khỏe răng miệng - được đưa vào.

→ Đáp án: **D**

31.**B**
Câu hỏi: ***What problem did Silva face when conducting the original study?***
A. A shortage of helpers.
B. A lack of available funding.
C. The bad behaviour of some children.
D. The poor language skills of the participants.
(***Vấn đề Silva gặp phải khi tiến hành nghiên cứu ban đầu là gì?***
A. Thiếu người giúp đỡ
B. Kỹ năng ngôn ngữ kém của người tham gia

C. Hành vi xấu của một số trẻ em.
D. Kỹ năng ngôn ngữ kém của người tham gia.)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Đoạn chứa đáp án:

There was precious little money at Silva's disposal, so the assessments were done in a church with the help of dozens of volunteers.

Nguồn kinh phí mà Silva có trong tay vô cùng hạn hẹp, vì vậy các cuộc đánh giá được tiến hành trong một nhà thờ với sự trợ giúp của hàng chục tình nguyện viên.

→ Đáp án: **B**

32.**B**
Câu hỏi: ***Why does the writer mention the new building in the fourth paragraph?***
A. To show how generous project funding had become.
B. To show that the study was being taken seriously.
C. To emphasise the temporary nature of the facilities.
D. To highlight that the children disliked the site.
(***Vì sao tác giả nhắc đến tòa nhà mới ở đoạn 4?***
A. Để cho thấy kinh phí trở nên dồi dào như thế nào
B. Để cho thấy nghiên cứu được coi trọng
C. Nhấn mạnh tính tạm bợ của cơ sở vật chất
D. Nêu bật việc trẻ em không thích địa điểm này)

Đoạn chứa đáp án:

It wouldn't have been the researchers' first choice, and was certainly not grand, but it was at least a site for the long term and its acquisition represented a landmark in the study's development.

Đây không phải là lựa chọn hàng đầu của các nhà nghiên cứu, và chắc chắn không hề hoành tráng, nhưng ít nhất đó cũng là một địa điểm có thể sử dụng lâu dài, và việc có được nơi này đánh dấu một cột mốc quan trọng trong quá trình phát triển của nghiên cứu.

→ Đáp án: **B**

33.**YES**
Câu hỏi: ***Recent results suggest that intellectual development and birth weight are linked.***
(Kết quả gần đây cho thấy sự phát triển trí tuệ có liên quan đến cân nặng lúc sinh.)

Đoạn chứa đáp án:

Among the most recent findings are that birth complications - a focus of Silva's original research - don't necessarily set children up for problems as they mature in later life, although the amount a newborn infant weighs is associated with IQ.

Trong số những phát hiện gần đây nhất là việc các biến chứng khi sinh - vốn là trọng tâm trong nghiên cứu ban đầu của Silva - không nhất thiết khiến trẻ gặp vấn đề khi trưởng thành sau này, mặc dù cân nặng của trẻ sơ sinh có mối liên hệ với chỉ số IQ.

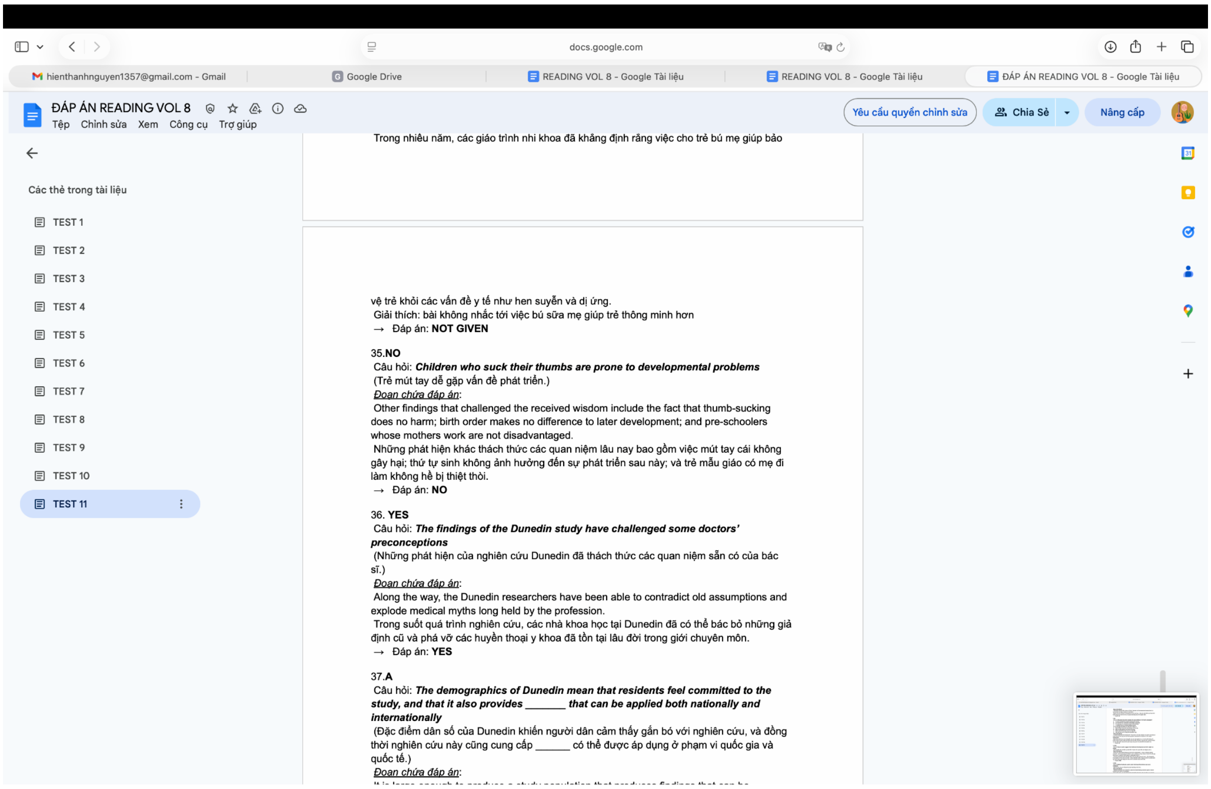
→ Đáp án: **YES**

34.**NG**
Câu hỏi: ***Medical textbooks used to claim that breast-fed children were more intelligent.***
(Sách y khoa từng cho rằng trẻ bú sữa mẹ thông minh hơn.)

Đoạn chứa đáp án:

Paediatric textbooks had insisted for years that breast-feeding protected against medical problems like asthma and allergies.

Trong nhiều năm, các giáo trình nhi khoa đã khẳng định rằng việc cho trẻ bú mẹ giúp bảo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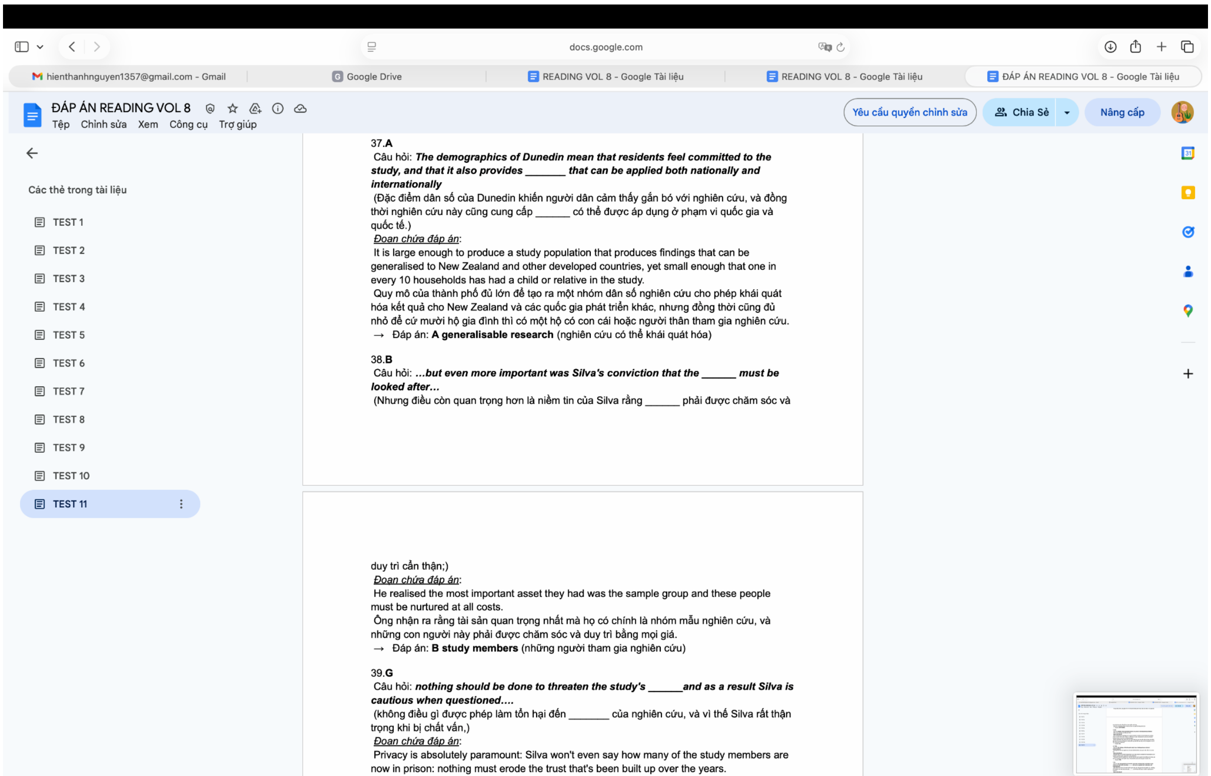
Trong nhiều năm, các giáo trình nhi khoa đã khẳng định rằng việc cho trẻ bú mẹ giúp bảo vệ trẻ khỏi các vấn đề y tế như hen suyễn và dị ứng.
Giải thích: bài không nhắc tới việc bú sữa mẹ giúp trẻ thông minh hơn
→ Đáp án: **NOT GIVEN**

35.**NO**
Câu hỏi: ***Children who suck their thumbs are prone to developmental problems***
(Trẻ mút tay dễ gặp vấn đề phát triển.)
Đoạn chứa đáp án:
Other findings that challenged the received wisdom include the fact that thumb-sucking does no harm; birth order makes no difference to later development; and pre-schoolers whose mothers work are not disadvantaged.
Những phát hiện khác thách thức các quan niệm lâu nay bao gồm việc mút tay cái không gây hại; thứ tự sinh không ảnh hưởng đến sự phát triển sau này; và trẻ mẫu giáo có mẹ đi làm không hề bị thiệt thòi.
→ Đáp án: **NO**

36. **YES**
Câu hỏi: ***The findings of the Dunedin study have challenged some doctors' preconceptions***
(Những phát hiện của nghiên cứu Dunedin đã thách thức các quan niệm sẵn có của bác sĩ.)
Đoạn chứa đáp án:
Along the way, the Dunedin researchers have been able to contradict old assumptions and explode medical myths long held by the profession.
Trong suốt quá trình nghiên cứu, các nhà khoa học tại Dunedin đã có thể bác bỏ những giả định cũ và phá vỡ các huyền thoại y khoa đã tồn tại lâu đời trong giới chuyên môn.
→ Đáp án: **YES**

37.**A**
Câu hỏi: ***The demographics of Dunedin mean that residents feel committed to the study, and that it also provides _______ that can be applied both nationally and internationally***
(Đặc điểm dân số của Dunedin khiến người dân cảm thấy gắn bó với nghiên cứu, và đồng thời nghiên cứu này cũng cung cấp _______ có thể được áp dụng ở phạm vi quốc gia và quốc tế.)
Đoạn chứa đáp án: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Đoạn chứa đáp án:

It is large enough to produce a study population that produces findings that can be generalised to New Zealand and other developed countries, yet small enough that one in every 10 households has had a child or relative in the study.

Quy mô của thành phố đủ lớn để tạo ra một nhóm dân số nghiên cứu cho phép khái quát hóa kết quả cho New Zealand và các quốc gia phát triển khác, nhưng đồng thời cũng đủ nhỏ để cứ mười hộ gia đình thì có một hộ có con cái hoặc người thân tham gia nghiên cứu.

→ Đáp án: **A generalisable research** (nghiên cứu có thể khái quát hóa)

38.**B**

Câu hỏi: ***…but even more important was Silva's conviction that the ______ must be looked after…***

(Nhưng điều còn quan trọng hơn là niềm tin của Silva rằng ______ phải được chăm sóc và duy trì cẩn thận;)

Đoạn chứa đáp án:

He realised the most important asset they had was the sample group and these people must be nurtured at all costs.

Ông nhận ra rằng tài sản quan trọng nhất mà họ có chính là nhóm mẫu nghiên cứu, và những con người này phải được chăm sóc và duy trì bằng mọi giá.

→ Đáp án: **B study members** (những người tham gia nghiên cứu)

39.**G**

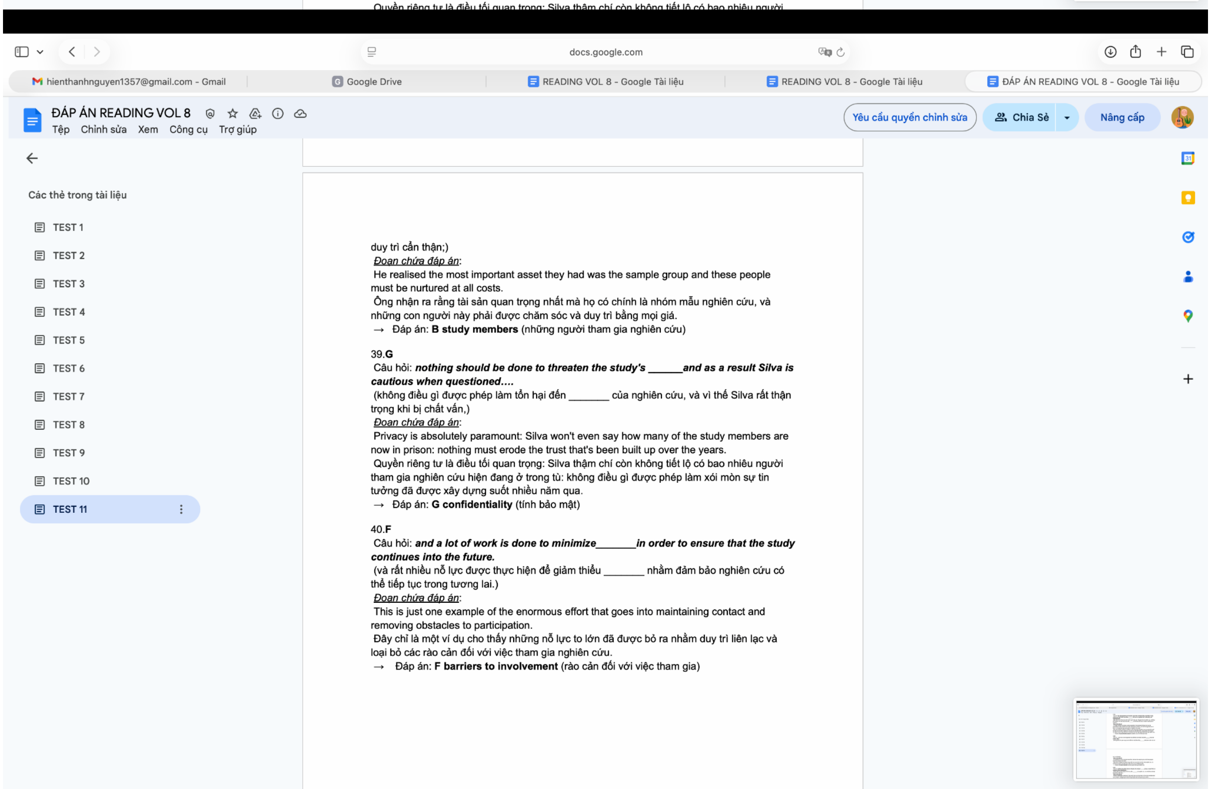
Câu hỏi: ***nothing should be done to threaten the study's ______and as a result Silva is cautious when questioned….***

(không điều gì được phép làm tổn hại đến _______ của nghiên cứu, và vì thế Silva rất thận trọng khi bị chất vấn,)

Đoạn chứa đáp án:

Privacy is absolutely paramount: Silva won't even say how many of the study members are now in prison: nothing must erode the trust that's been built up over the years.

Quyền riêng tư là điều tối quan trọng: Silva thậm chí còn không tiết lộ có bao nhiêu người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Đoạn chứa đáp án:

Privacy is absolutely paramount: Silva won't even say how many of the study members are now in prison: nothing must erode the trust that's been built up over the years.

Quyền riêng tư là điều tối quan trọng: Silva thậm chí còn không tiết lộ có bao nhiêu người tham gia nghiên cứu hiện đang ở trong tù: không điều gì được phép làm xói mòn sự tin tưởng đã được xây dựng suốt nhiều năm qua.

→ Đáp án: **G confidentiality** (tính bảo mật)

40.**F**

Câu hỏi: ***and a lot of work is done to minimize_______in order to ensure that the study continues into the future.***

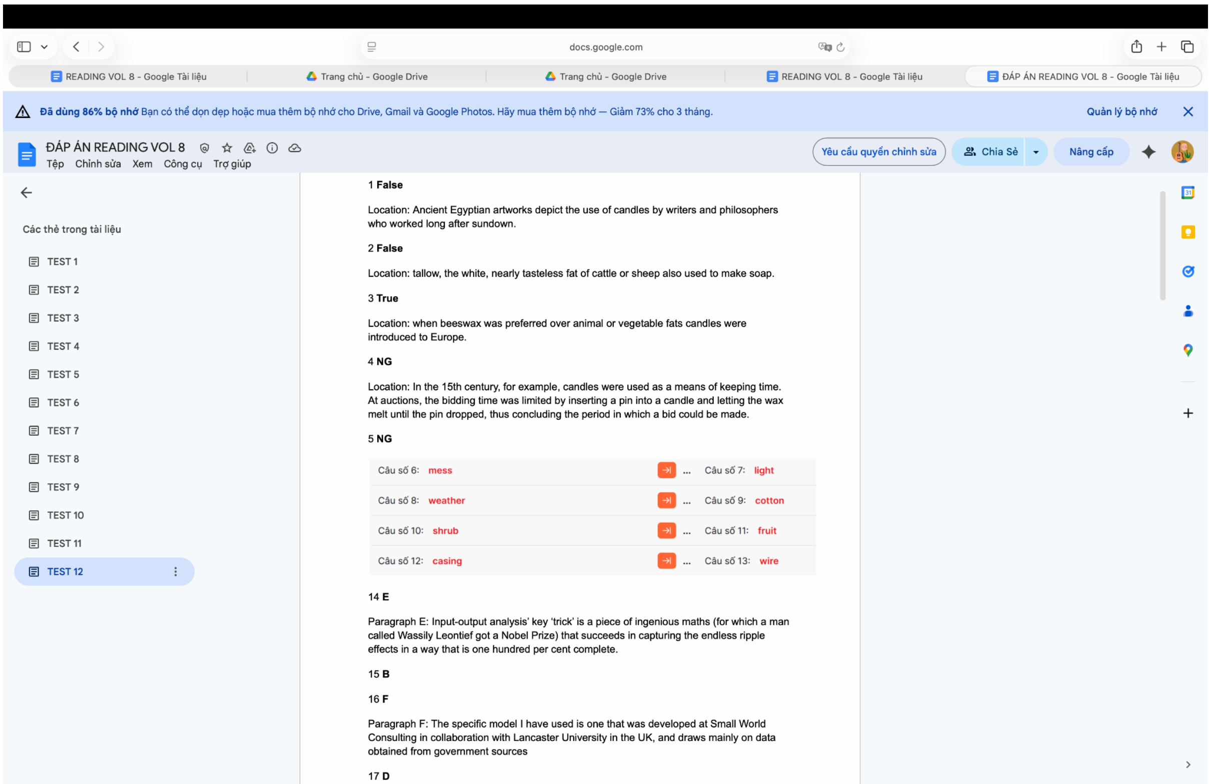
(và rất nhiều nỗ lực được thực hiện để giảm thiểu _______ nhằm đảm bảo nghiên cứu có thể tiếp tục trong tương lai.)

Đoạn chứa đáp án:

This is just one example of the enormous effort that goes into maintaining contact and removing obstacles to participation.

Đây chỉ là một ví dụ cho thấy những nỗ lực to lớn đã được bỏ ra nhằm duy trì liên lạc và loại bỏ các rào cản đối với việc tham gia nghiên cứu.

→ Đáp án: **F barriers to involvement** (rào cản đối với việc tham gia)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1 **False**

Location: Ancient Egyptian artworks depict the use of candles by writers and philosophers who worked long after sundown.

2 **False**

Location: tallow, the white, nearly tasteless fat of cattle or sheep also used to make soap.

3 **True**

Location: when beeswax was preferred over animal or vegetable fats candles were introduced to Europe.

4 **NG**

Location: In the 15th century, for example, candles were used as a means of keeping time. At auctions, the bidding time was limited by inserting a pin into a candle and letting the wax melt until the pin dropped, thus concluding the period in which a bid could be made.

5 **NG**

Câu số 6:	mess	Câu số 7:	light
Câu số 8:	weather	Câu số 9:	cotton
Câu số 10:	shrub	Câu số 11:	fruit
Câu số 12:	casing	Câu số 13:	wire

14 **E**

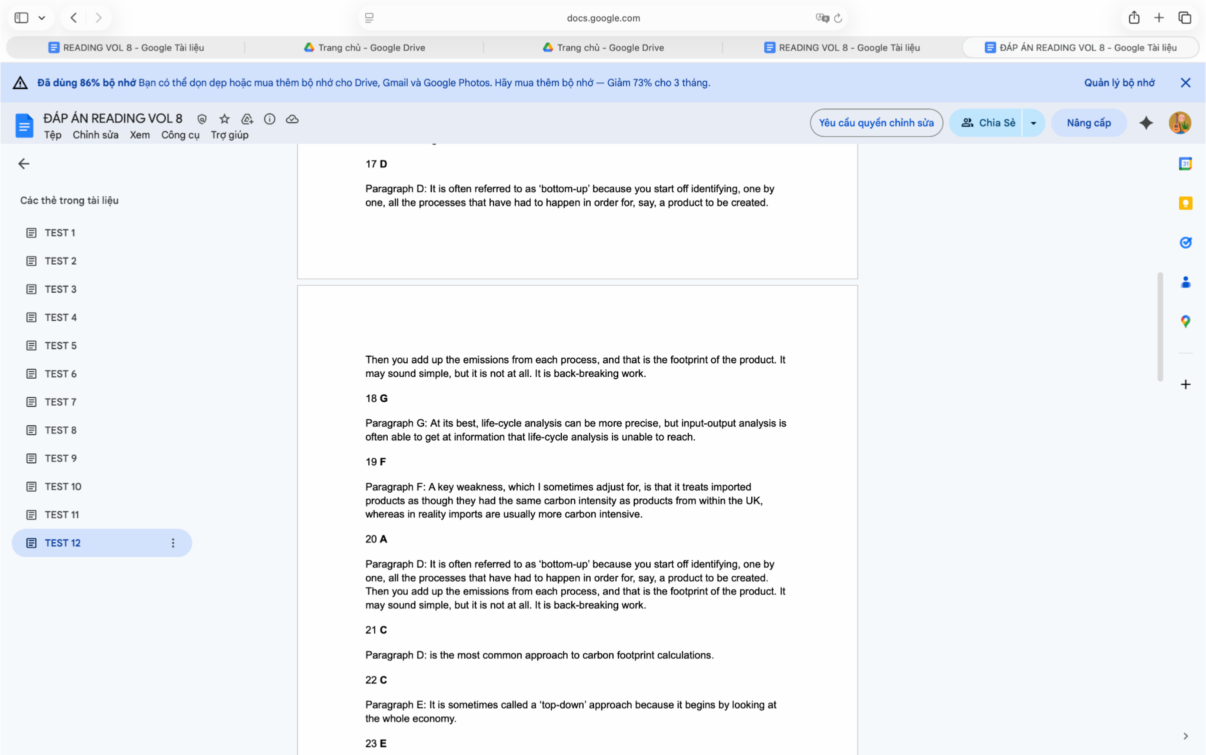
Paragraph E: Input-output analysis' key 'trick' is a piece of ingenious maths (for which a man called Wassily Leontief got a Nobel Prize) that succeeds in capturing the endless ripple effects in a way that is one hundred per cent complete.

15 **B**

16 **F**

Paragraph F: The specific model I have used is one that was developed at Small World Consulting in collaboration with Lancaster University in the UK, and draws mainly on data obtained from government sources

17 **D**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17 **D**

Paragraph D: It is often referred to as 'bottom-up' because you start off identifying, one by one, all the processes that have had to happen in order for, say, a product to be created.

Then you add up the emissions from each process, and that is the footprint of the product. It may sound simple, but it is not at all. It is back-breaking work.

18 **G**

Paragraph G: At its best, life-cycle analysis can be more precise, but input-output analysis is often able to get at information that life-cycle analysis is unable to reach.

19 **F**

Paragraph F: A key weakness, which I sometimes adjust for, is that it treats imported products as though they had the same carbon intensity as products from within the UK, whereas in reality imports are usually more carbon intensive.

20 **A**

Paragraph D: It is often referred to as 'bottom-up' because you start off identifying, one by one, all the processes that have had to happen in order for, say, a product to be created. Then you add up the emissions from each process, and that is the footprint of the product. It may sound simple, but it is not at all. It is back-breaking work.

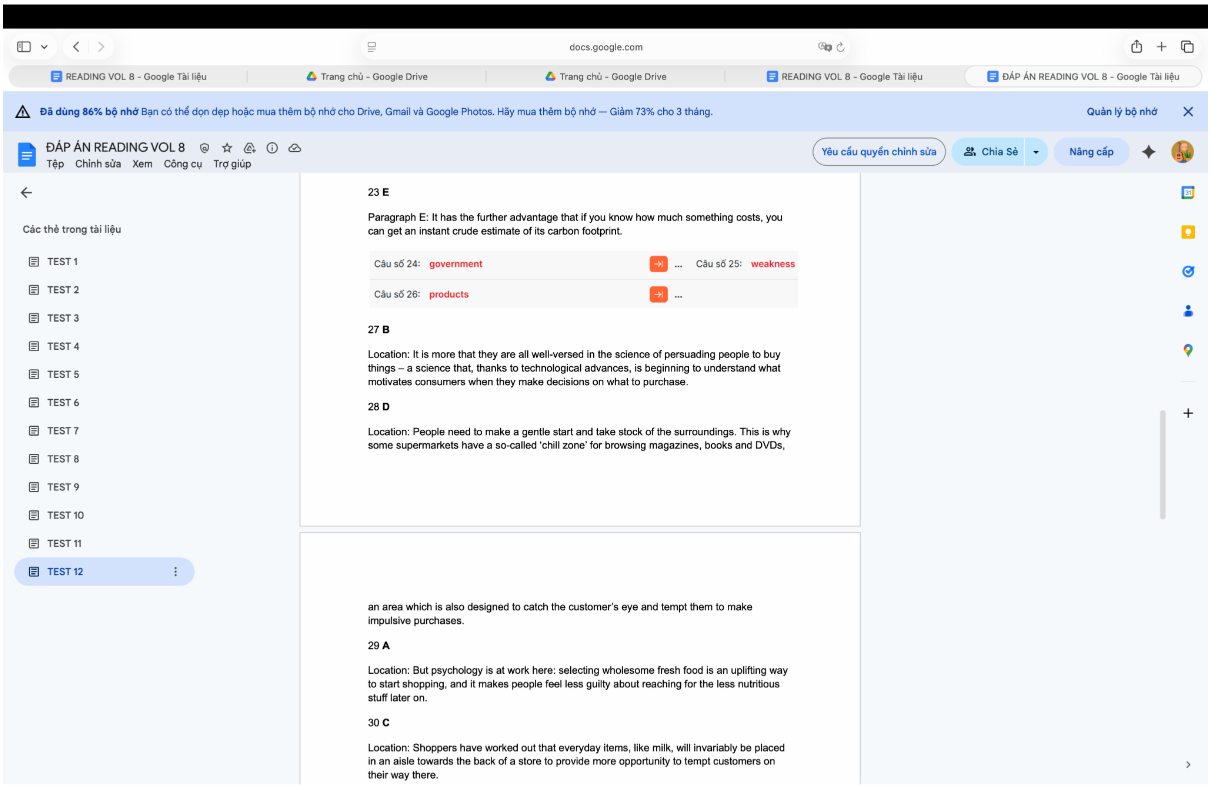
21 **C**

Paragraph D: is the most common approach to carbon footprint calculations.

22 **C**

Paragraph E: It is sometimes called a 'top-down' approach because it begins by looking at the whole economy.

23 **E**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23 **E**

Paragraph E: It has the further advantage that if you know how much something costs, you can get an instant crude estimate of its carbon footprint.

Câu số 24: government ... Câu số 25: weakness

Câu số 26: products ...

27 **B**

Location: It is more that they are all well-versed in the science of persuading people to buy things – a science that, thanks to technological advances, is beginning to understand what motivates consumers when they make decisions on what to purchase.

28 **D**

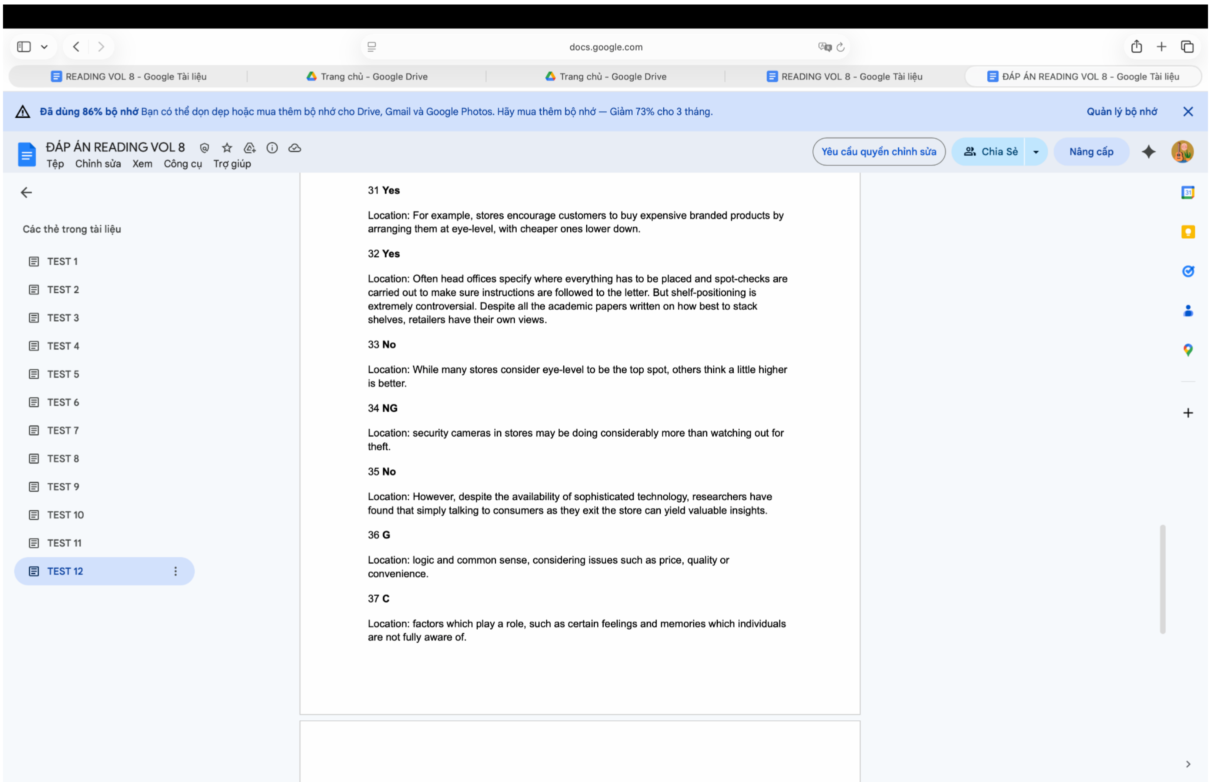
Location: People need to make a gentle start and take stock of the surroundings. This is why some supermarkets have a so-called ‘chill zone’ for browsing magazines, books and DVDs, an area which is also designed to catch the customer’s eye and tempt them to make impulsive purchases.

29 **A**

Location: But psychology is at work here: selecting wholesome fresh food is an uplifting way to start shopping, and it makes people feel less guilty about reaching for the less nutritious stuff later on.

30 **C**

Location: Shoppers have worked out that everyday items, like milk, will invariably be placed in an aisle towards the back of a store to provide more opportunity to tempt customers on their way there.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31 **Yes**

Location: For example, stores encourage customers to buy expensive branded products by arranging them at eye-level, with cheaper ones lower down.

32 **Yes**

Location: Often head offices specify where everything has to be placed and spot-checks are carried out to make sure instructions are followed to the letter. But shelf-positioning is extremely controversial. Despite all the academic papers written on how best to stack shelves, retailers have their own views.

33 **No**

Location: While many stores consider eye-level to be the top spot, others think a little higher is better.

34 **NG**

Location: security cameras in stores may be doing considerably more than watching out for theft.

35 **No**

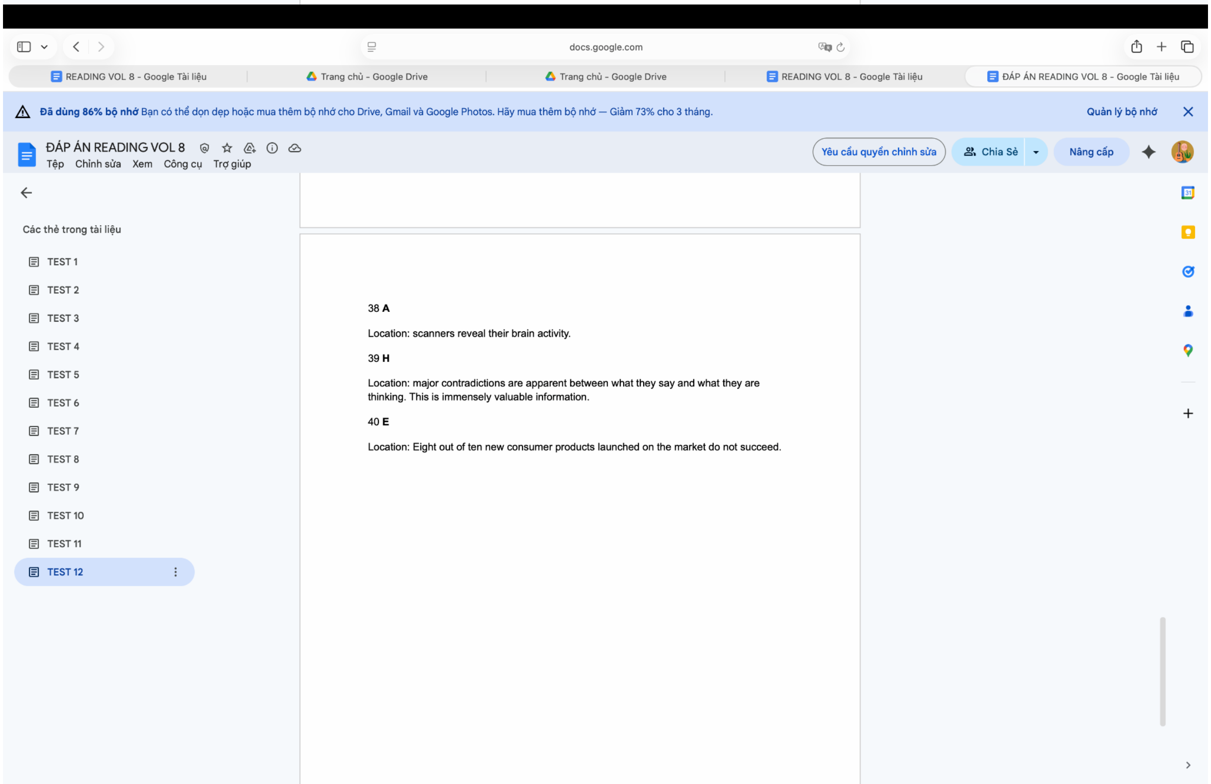
Location: However, despite the availability of sophisticated technology, researchers have found that simply talking to consumers as they exit the store can yield valuable insights.

36 **G**

Location: logic and common sense, considering issues such as price, quality or convenience.

37 **C**

Location: factors which play a role, such as certain feelings and memories which individuals are not fully aware of.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38 **A**

Location: scanners reveal their brain activity.

39 **H**

Location: major contradictions are apparent between what they say and what they are thinking. This is immensely valuable information.

40 **E**

Location: Eight out of ten new consumer products launched on the market do not succeed.